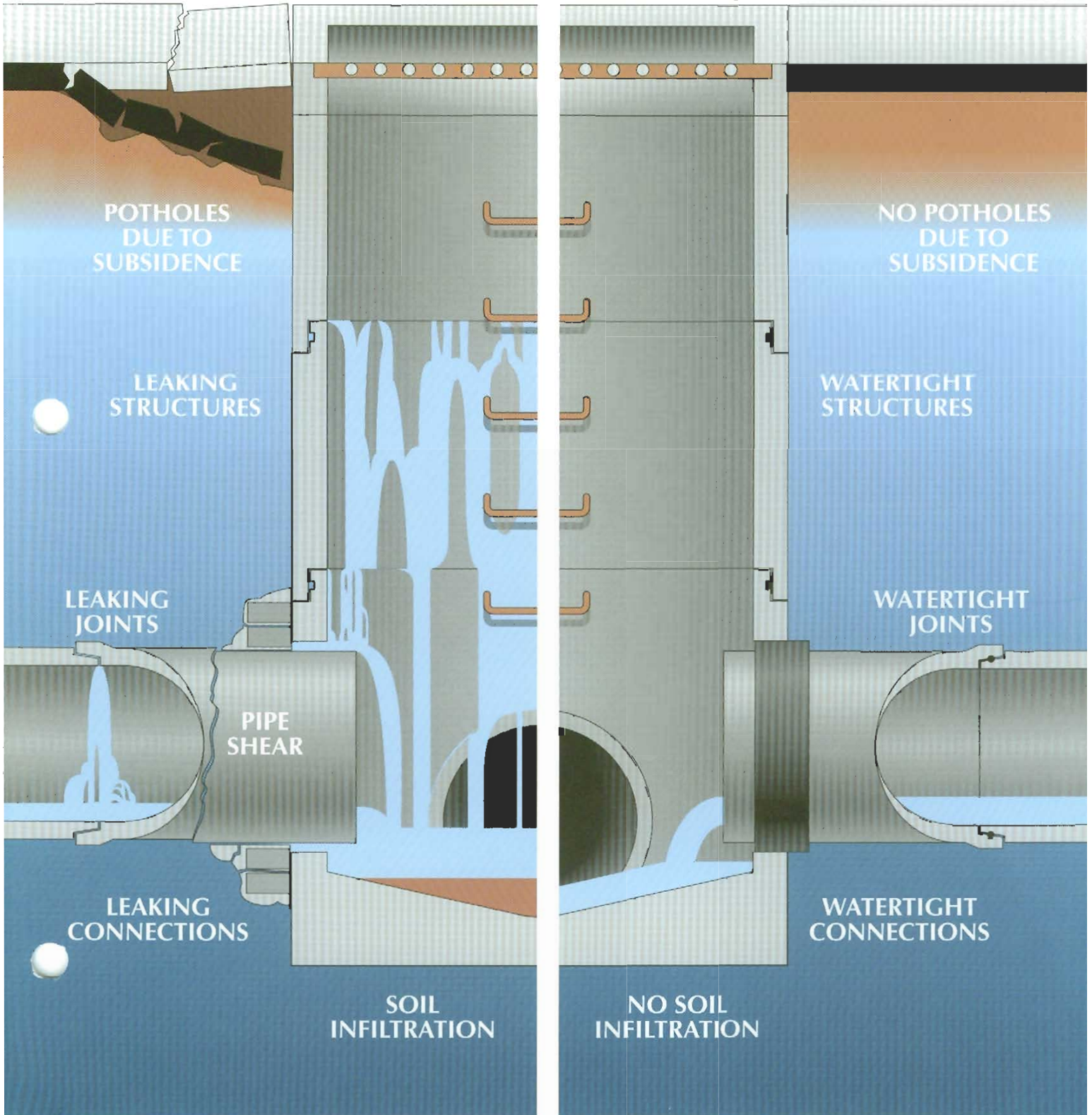


Watertight Storm Sewers Save Money



Engineers, Municipalities Watertight Storm



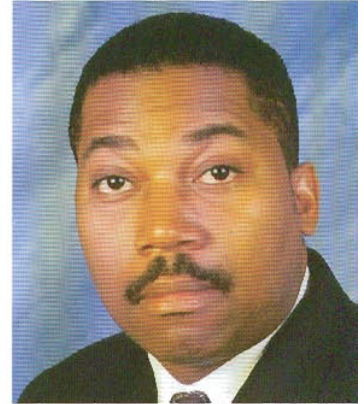
Marc Eshelman, P.E.
Special Projects Group Leader
P. B. Booker Associates Inc.
St. Louis, MO

"Connectors, whether they are flexible or not, seldom cost more than 3% of the total job, but the greatest expense of not using flexible connections comes later, if those connections start to leak. Then, you have the cost of going back and uncovering the structure, fixing the problem, backfilling, and repairing the street.

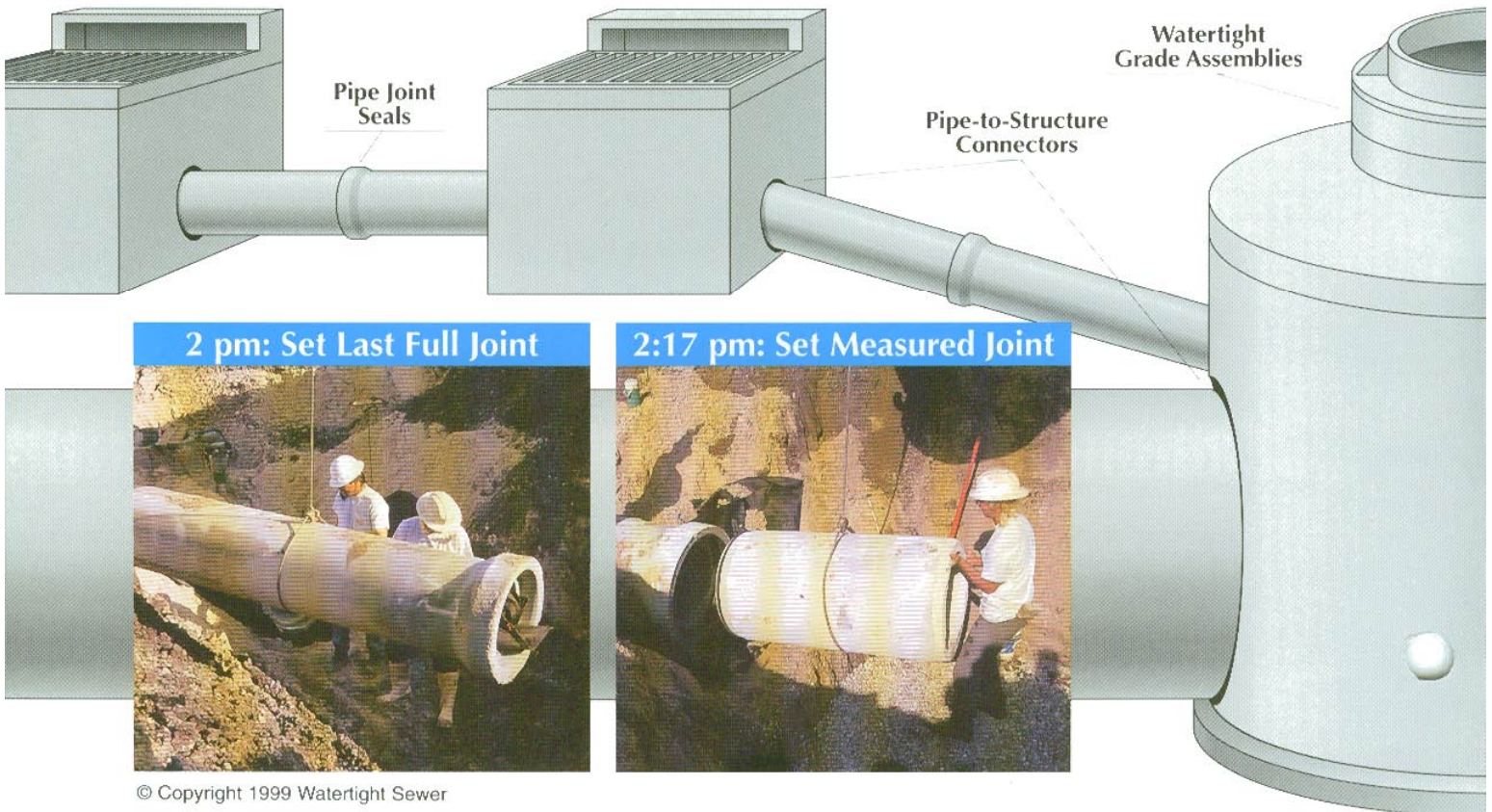
"Just stopping a leak can be expensive, but repairing a sheared pipe or pavement failure is very expensive. A pavement failure due to subsidence can cost several thousand dollars to repair, plus the danger and disruption. If it's severe, it could cost much more.

"We have found that when we use flexible connectors, we are less dependent on field conditions and construction methods. We have more confidence in products which have been manufactured in a controlled environment, and we have found that installation quality is more consistent than with brick and mortar construction.

"A flexible connection is an important advantage. Sometimes the soil material around a structure will shift or settle. If you have a tightly grouted connection, you run the risk of cracking the structure or the pipe. At the very least, the mortar can crack and the watertight seal will be lost."



Ronald L. Moore
Materials Engineer
Metropolitan St. Louis Sewer District
St. Louis, MO

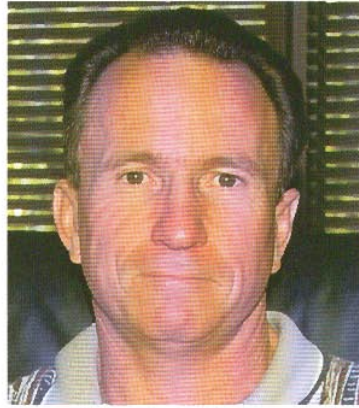


Engineers, and Contractors agree Sewers Save Money

"At Metropolitan St. Louis Sewer District, we have insisted on watertight storm sewer systems for over 10 years. Watertight systems prevent erosion and subsidence around structures, and eliminate the high cost of repairing damage to streets and sidewalks caused by leaks. That's the main reason we specify that watertight, flexible connectors must be used in all connections in our storm sewer system.

"If you have a failure at a structure in a street and you have to dig down and fix the connection, the minimum cost is about \$1,500 and it can run up to two or three times that much. That type of repair used to be common, but I haven't seen one needed anywhere we have used flexible connectors.

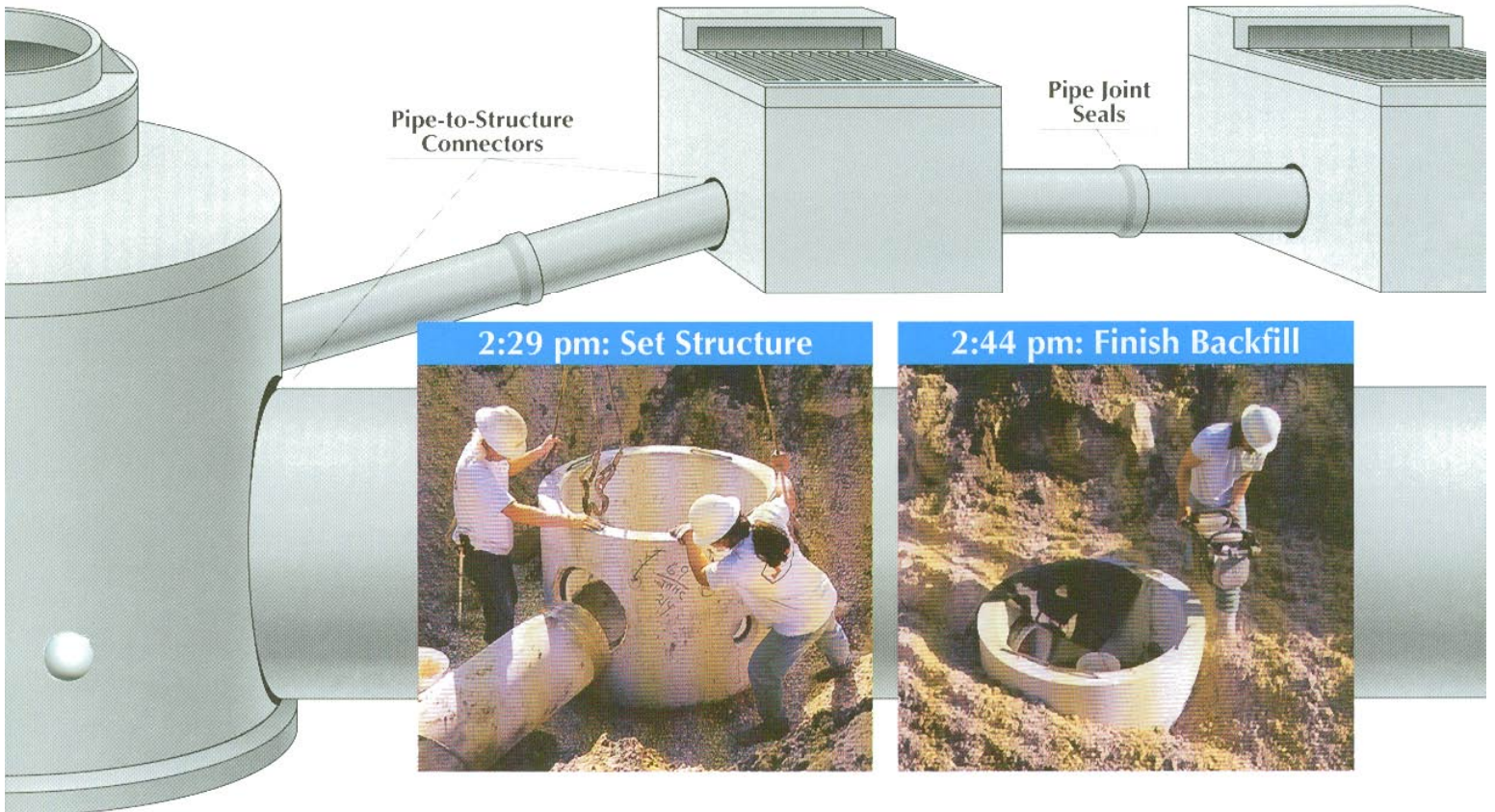
"I believe when structures are precast with flexible connectors in place, contractors can make pipe connections to those structures much easier than before. In the past, contractors would have to mix and match mortar and bricks to close the holes between pipes and structures. Now, they just connect the pipe right into the structure and they have a watertight seal. That means that projects take less time than they used to, and we have fewer open excavations."



Steve Blomeley
President
JMHC, Inc.
Longwood, FL

"There are so many benefits of using flexible connectors that I would be hard-pressed to think of them all. First of all, it's hard to accurately estimate the cost of using brick and mortar connectors. It's different with every crew, every job, and every structure. But, I know almost exactly what it will cost to use flexible connectors. And, I know I will not have to go back later and stop leaks. Plus, I'll get at least 10% more total production when I use the flexible connectors, often 20%. That gives me a competitive advantage.

"We cost a structure almost as if it were another piece of pipe. We include the cost of the structure, the connectors, and whatever materials go under it. The materials then, are a fixed cost. You don't have the variables of lost bricks, cement that gets caught in the rain, whether or not water is available, how long you'll have to wait before you backfill, and the other variable costs that go into brick and mortar connections. We have very identifiable, fixed costs. That's important if you have 100 structures on a job. With flexible connectors, you are not leaving yourself open to how long it might take to seal up a 48-inch pipe, how much material might be used or lost, and the quality of the connection."



The table below is a comparison of the tangible and intangible costs associated with making one connection between an 18"-diameter concrete pipe and a precast concrete structure.

Brick and Mortar		Flexible Connector
Bricks Used	\$ 18.00	Flexible Connector \$ 140.00
Bricks Wasted	\$\$.\$	
Mortar Used	30.00	
Mortar Wasted	\$\$.\$	
Water	2.00	
Labor	75.00	
Additional Supervision	15.00	
Additional Bookkeeping	7.50	
Callbacks to Seal Leaks	50.00 Average per occurrence	
<i>Lost Production due to:</i>		
De-watering	\$\$.\$	
Waiting for Mortar to Set	150.00	
Backtracking Machinery	50.00	
<i>Intangible Costs:</i>		
Prolonged Danger of Open Trench	\$\$.\$	
Lost Momentum of Crew	\$\$.\$	
Property Owner Dissatisfaction	\$\$.\$	
<i>Probable Future Costs:</i>		
Remove Silt from Pipeline	3.00 Per lineal foot	
Subsidence Danger to Vehicles	\$\$.\$	
Repair Subsidence Damage	1,000.00 Average per occurrence	
Repair Leaking Connection	50.00 Average per occurrence	
Lower Property Values	\$\$.\$ and votes	
Lower Tax Revenues	\$\$.\$ and growth	
Total	\$\$.\$	\$ 140.00



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