

**Position Paper**  
**Resilience of HDPE Pipe for Water & Wastewater Infrastructure**  
**September 2015**

**Position**

North American utilities depend on underground infrastructure such as gas and electric power grids, transportation networks, and water and wastewater systems operated by local governments and private utilities. The need for more sustainable and resilient infrastructure becomes painfully clear when these systems fail because of external loads or pressures, or during a natural disaster. Local officials have long sought to design infrastructure that can better withstand extreme forces caused by earthquakes, hurricanes and landslides. High Density Polyethylene (HDPE) piping and fittings are inherently tough and resistant to damage caused by external force, and offer municipal officials a cost-effective, sustainable and resilient alternative to traditional water, wastewater and stormwater systems.

**Background**

Local public works agencies in high-seismic areas often deal with weak underground water and wastewater infrastructure primarily because buried pipe systems are more susceptible to damage from earthquake-caused ground failures such as liquefaction, landslide, surface faulting, and other effects. As technology and piping materials progress, water utilities are increasingly looking to retrofit or replace older iron or steel water transmission piping with materials that better withstand seismic activity and other natural forces.

Earthquakes, hurricanes and tsunamis have established a benchmark for severity and consequences of extreme natural events. From the levies in New Orleans that failed during Hurricane Katrina in 2005 to the underground systems in New York City in the wake of Hurricane Sandy in 2012, it is clear that ensuring solid infrastructure must be a priority for local governments. In the case of earthquakes, the bulk of total damage to water systems and associated water outages is often attributed to the failure of smaller diameter distribution pipes in regions with infirm soil. Until water and wastewater utilities install seismically-resistant pipes in these areas, this problem will continue to occur and reoccur during future earthquakes.

HDPE pipe systems provide municipalities and other local communities with an alternative to traditional and more brittle piping that cannot endure outside force as effectively. Because of the joining technology, HDPE provides a highly leak-resistant pipe system that eliminates water loss and infiltration of contaminants and has an excellent performance record in shifting soils and earthquake-prone areas. HDPE also resists the effects of freezing and allows bending without the need for a high number of fittings. Because of its flexibility, HDPE can be installed with bends over uneven terrain easily in continuous lengths without additional welds or couplings. These same characteristics serve HDPE pipe systems well in case of land movement, whether over long periods of time or during natural disasters.

Local officials are often the gatekeepers of our environmental infrastructure, namely water, wastewater and stormwater systems. Public works officials are rethinking the way risks of natural hazards are addressed. Contemporary HDPE piping offers effective protection against rare but high-consequence natural events such as earthquakes, hurricanes and landslides. Public policy at all levels of government should provide every opportunity to make this piping option available to those charged with overseeing these fundamental lifelines to communities across the country.