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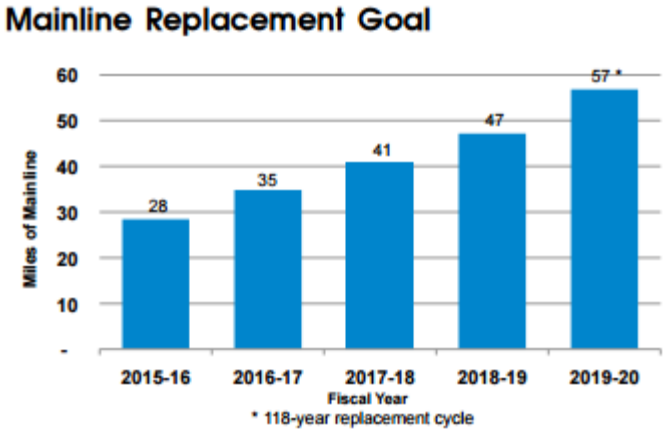
LADWP Utilizes SYNERGY™/Powercrete® J Combination for Enhanced Protection of Mainline Pipe

The asset management program implemented by the Los Angeles Department of Water and Power (LADWP) aims to improve the quality of its aging water infrastructure. The goal is to manage assets in a way that will result in a lower cost of ownership. The infrastructure upgrade plan includes distribution mainlines, trunk lines, large valves, pressure regulators and relief stations, pumping stations, meters, and improvements to the Los Angeles aqueduct system. In total, the LADWP asset management program is expected to cost $2.2 billion dollars through fiscal year 2020.

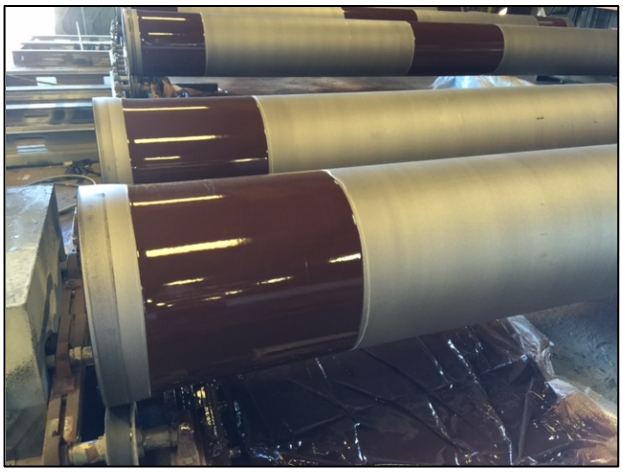
Included in the asset management program is a replacement program of up to 145 miles of mainline pipe and fittings, defined as 20-inch and smaller in diameter. LADWP's replacement goal recently published in its 2016-17 Water Infrastructure Plan is depicted in the chart at right. Additionally, LADWP plans to eliminate 500 miles of leak-prone and high-risk pipelines throughout its system in the next 10 years. A large percentage of the lines are carbon steel pipe in need of cement mortar lining and coating with a bonded coating to add corrosion protection.



Source: LADWP Water Improvement Plan published in 2016

LADWP's previous specification allowed for only AWWA C215 extruded polyethylene for the mainline coating with AWWA C205 cement mortar coating for added mechanical protection. LADWP primarily used the AWWA C215 extruded polyethylene, but it was experiencing a "shrink-back" effect that is common when polyethylene is heated then cooled. After heating to the melting point, polyethylene can take several days to cool. During the cooling process the polyethylene shrinks considerably as it returns to its solid state, resulting in the product shrinking beneath the cement mortar coating. This shrink-back results in an area potentially exposed to corrosion at the joint weld.

A solution to this shrink-back effect was developed in conjunction with the Metropolitan Water District (MWD), LADWP, and Mobile Pipe Lining and Coating, Inc. utilizing AWWA C225-compliant SYNERGY™ and AWWA C210-compliant Powercrete® J products. Using this solution, each 20-foot pipe section is coated with 18 inches of Powercrete® J at each end. The specification then calls for either an AWWA C215 extruded polyethylene or an AWWA C225-compliant

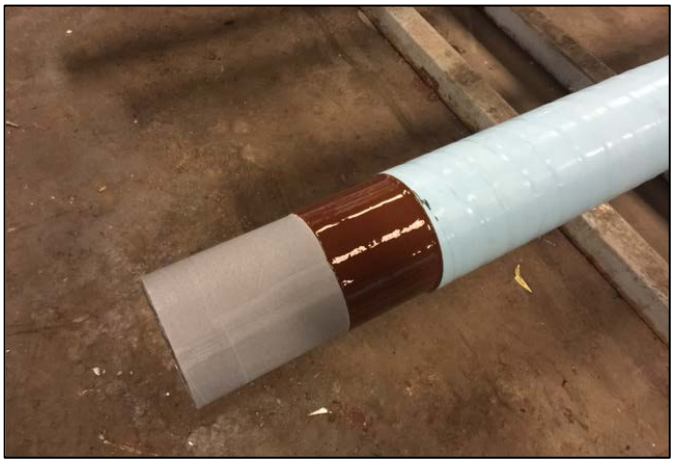


Powercrete® J is applied per AWWA C210 with a minimum thickness of 20 mils. The steel is blasted per SSPC SP-5. This process occurs after the pipe is cement mortar lined per AWWA C205.

SYNERGY™ coating system to be applied over the Powercrete® J and the remaining exposed steel. All fittings and specials that are not straight are also coated with Powercrete® J. When connected in the field, a Powercrete® field kit is applied at the weld joint to eliminate potential corrosion at the joint/coating interface.

Mobile Pipe submitted samples to the MWD testing facility in Laverne, California. One of the tests consisted of a 120-day cathodic disbondment test complying with the ASTM G8 standard. Rather than an "x" cut, current loss was measured over the 120-day time frame. Failure occurs at 1.0 mV. The testing showed no significant loss of current when using the AWWA C225-compliant SYNERGY™ or SYNERGY™/Powercrete® J combinations. After completion of the cathodic disbondment test, the system was ready for approval by MWD and LADWP engineers, resulting in the S-1302 specification update in June 2015. It is now released for use within the LADWP water system.

A 6-inch holdback is left for field connection, while the AWWA C225-compliant SYNERGY® coating system is applied over the top of the 18-inch Powercrete® J extending the entire length of the pipe.



Since the AWWA C225 polyethylene was melted and cooled in Mobile Pipe's factory controlled environment, there is no risk of shrink-back.

Mobile Pipe Lining and Coating, Inc. has over 20-years' experience applying Synergy™ and Powercrete® coating systems to steel pipelines. Mobile Pipe's automated equipment, applicator qualifications, and QP3[SM] Quality Control Certification make Mobile Pipe the leading applicator supplying these coating systems.

Contact Andy Sterling, asterling@mobilepipe.net, for more information on LADWP's S-1302 specification or for answers to application questions regarding us of this hybrid product system.