
TIP Project Brief – 090072/10H017

Civil Infrastructure A Rapid Underground Pipe Rehabilitation Technology

Develop an advanced trenchless technology to rehabilitate the nation's network of underground pipes by employing a novel dynamic resin-injection, molded-in-place pipe (MIPP) process, which can incorporate nanomaterials.

Sponsor: LMK Enterprises, Inc.

Ottawa, IL

- Project Performance Period: 2/1/2010 - 7/31/2012
- Total project (est.): \$3,411 K
- Requested TIP funds: \$1,701 K

LMK Enterprises is developing a novel technology for repairing and rehabilitating underground pipes from the inside, without the need to dig trenches to expose the damaged pipe. There are a handful of existing or proposed technologies that attempt the same feat. Three basic approaches involve either pulling a new liner, impregnated with a quick-setting resin, through the old pipe in a collapsed form and expanding it with air or water pressure; wrapping the inside of the old pipe with a new, solid lining material like a spiral layer of tape; or spraying the inside of the old pipe with some form of quick-curing coating. These current technologies have various drawbacks. In the case of pre-formed liners, for example, it's necessary to know the diameters and lengths of the old pipe section in advance, so as to manufacture custom tailored liner tubes. Current technologies also do not capitalize on the latest advances, such as nanomaterials, and suffer from other limitations, such as lack of cost-effectiveness and versatility of applications. LMK Enterprises proposes to develop an advanced trenchless technology to rehabilitate the nation's ever deteriorating network of underground pipes by employing a novel dynamic resin-injection, molded-in-place pipe (MIPP) process, which can incorporate nanomaterials. A quick-curing composite resin that could include recently developed nanomaterials for additional strength is mixed in place by an extruding device that applies the mixture between an inflatable bladder and pipe wall providing a smooth and even surface. The proposed LMK technology is novel and offers several advantages over current technologies such as increased productivity by significantly reducing installation time; reduced cost by eliminating the need for a custom tailored resin-impregnated liner tube; improved mechanical properties by employing nanomaterials; and enhanced performance by yielding smooth and uniform wall thickness. According to the Environmental Protection Agency, the annual market for rehabilitation of waste water infrastructure in the United States is approximately \$7 billion, and the annual market for potable water infrastructure repair is about \$10 billion. The proposed technology has a broad application potential, since it is applicable for rehabilitating all types of pipes including potable water, sewer, gas, oil, steam, and compressed air, and these markets offer a significant opportunity.

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