AP/M PERMAFORM
the trenchless solutions company
www.permaform.net

ConShield
biotech armor for concrete

CENTRIPIPE™

Industry leaders and innovators since 1975 in developing Robotic Systems and Engineered Structural Concrete Systems for the Trenchless (No Dig) Restoration of buried - Storm and Waste Water Systems

TSP2 – NEBPP 2019
Technical Presentation

Presenters
Joe Cherry APM Permaform
Dennis Buckshaw APM Permaform

AP/M Permaform

1975
Company Founded

PERMAFORM

1985
Bi-Directional SpinCaster

PERMACAST

1996
ConShield Introduced

CONSHIELD

2003
CCCP Introduced

CENTRIPIPE™

Plato's Republic
380 BC

Necessity the Mother of Invention

Early 1970's – the birth of a New Industry
TRENCHLESS RESTORATION

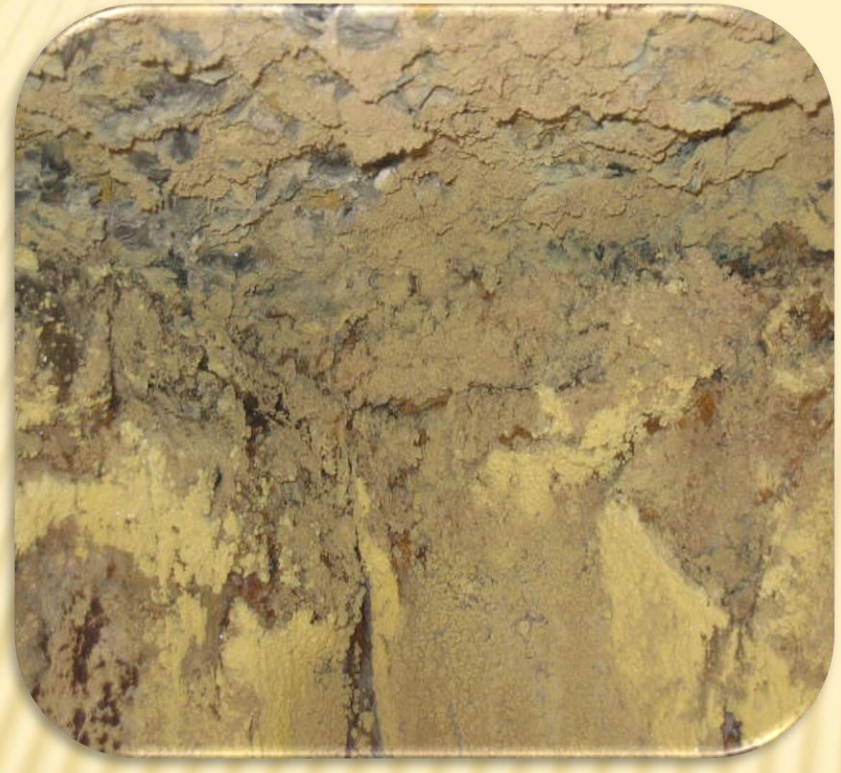
CentriPipe Video

AP/M Patented Bi-Directional SpinCaster

Conforms to Host Shapes Minimizing area Reduction

STRUCTURALLY FAILED SYSTEMS

Microbial Induced Corrosion (MIC)



Hydrated Iron Oxides (Rust)

Restoration Solutions

Waste Water

PL 8000 Engineered Concrete + ConShield

Storm Water

PL 8000 Concrete

Complexed Engineered High Performance FAHP - Concrete Systems

PERMACAST®

PL 8000
PL 8000D
MS 10000

Densely Graded Quartz Aggregates

Rust Inhibitors

Crystal X
(Crystalline Powders)
Self-Healing System

Rheology Modifiers

Reactive Pozzolans

High (Ductility) – Watertight Concrete

CentriPipe FAHP Concrete Systems
Thin Shell Toughness that remains Ductile - High MOR (Flexural Strength)

Initial Set = 170 Min/2.8 Hours **Final Set** = 300 Min/5 Hours

CENTRIPIPE®

PERMACAST® PL-8,000 Technical Data Sheet

CENTRIFUGALLY CAST CONCRETE PIPE

High strength, factory blended cementitious liner material designed for renewal of underground concrete storm and sanitary sewer pipe creating a new pipe within the old.

It is the intent of this product to provide for the waterproofing, sealing, structural reinforcement and corrosion protection of existing underground sewer pipe by the safe, quick and economical application of a uniform cementitious layer of special mortar that cures in place to form an interior hardened shell.

PHYSICAL PROPERTIES

Color	Gray
Special Handling	None-keep dry
Shelf Life	One year
Water Demand	118 - 128 fl. oz./bag
Coverage	50# bag yields .42 cu. ft.
Working Time	30 minutes

NOMINAL VALUES

Set Time at 70°F ASTM C-403	
Initial Set	Approx. 170 minutes
Final Set	Approx. 300 minutes
Compressive Strength ASTM C-109	
24 hours	4,000 psi
28 days	10,000 psi
Flexural Strength ASTM C-293	
24 hours	1,200 psi
28 days	1,530 psi
Slant Shear Bond ASTM C-882	
28 days	2,900 psi
Tensile Strength ASTM C-496	
28 days	835 psi
Sulfate Resistance ASTM C-267	No damage
*5% Solution H_2SO_4	30 days
*Samples received two coats of CS Identifier 300 sf per gallon coverage rate.	
Freeze Thaw ASTM C-666	300 Cycle Pass
Freeze Thaw Chloride Solution	300 Cycle <1%
Modulus of Elasticity ASTM C-469	
28 days 4-inch cylinder	5.26 X 10^6 psi
Rapid Chloride Permeability ASTM C-1202 (AASHTO T-277)	< 50 Coulombs

The Physical properties contained herein were obtained under laboratory conditions at 72° F. Physical properties obtained under field conditions may vary do to environmental variables. Data are subject to reasonable deviation.

GENERAL

This information establishes the minimum standard for material and method of application for restoring and sealing leaking and deteriorated sewer pipe, culvert pipe and manholes by centrifugally casting PERMACAST® PL-8,000, onto its interior in one or more passes at a specified thickness.

MATERIAL

The material, PERMACAST® PL-8,000, is a high strength, high build, abrasion resistant and corrosion resistant mortar, based on advanced cements and additives. When mixed with the appropriate amount of water, a paste-like material will develop which may be sprayed, cast or pumped into any area ¼ inch and larger.

The hardened liner is dense and highly impermeable. The above performance is achieved by a complex formulation of mineral, organic and densifying agents and sophisticated chemical admixtures including rust inhibitors. Graded quartz sands are used to enhance particle packing and further improve the fluidity and hardened density. The composition also possesses excellent thin-section toughness, high modulus of elasticity and self-bonding. Fibers are added as an aid to casting, for increased cohesion and to enhance flexural strength.

The water content may be adjusted to achieve consistencies ranging from plastic to modeling clay. Despite its workability, the mortar has good wet adhesion and does not sag or run after placement. The mortar may be cast against soil, metals, wood, plastic or other normal construction material.

EQUIPMENT

Mortar mixers, compressors and pumps are standard commercial models. Please contact AP/M for equipment specifications. The high speed, rotating applicator device is provided with the material to certified applicators.

Initial Set = 7 – 10 Minutes **Final Set** = 10 – 15 Minutes

CENTRIPIPE®

PERMACAST® PL-8,000D Technical Data Sheet

Cementitious Structural Fiber Reinforced, rapid hardening, early entry concrete liner for dry-gun applications.

Description

PL-8000D is a natural and synthetic fiber-reinforced, rapid hardening, cementitious ready to use material designed by using the highest structural and safety considerations for dry-gunning method. Only water should be added to achieve desirable results. Material could be sprayed on at 1/4 inch (6.4 mm) and up to 10 inch (254 mm) thick in a single application providing unparalleled flexural, adhesive properties for structural support and impermeable protection. It is designed to provide high strength and reliable stabilization of a variety of vertical and horizontal surfaces in a high range of environmental conditions. PL-8000D reaches over 3,000 psi in one hours after placement. PL-8000D is extremely durable and uses a mix of fibers with properties that are equal or exceed glass fibers properties but are very stable in alkali cement environments, PL-8000D may be used anywhere there is potential for strata deterioration that would require extra structural support of installed liners.

Advantages

- Rapid Hardening
- One component just add water
- Structural natural and synthetic mix fibers reinforced
- High flexural Strength
- High early Strength
- Excellent adhesion to variety of substrates
- Easy to apply
- No rebound during application
- Waterproofs existing structures
- Contains no harmful chemicals
- Temperature of application 40 to 85°F(4.4 to 29.44°C)
- Applied free of dust at nozzle
- Quality Control every batch

Applications

- Rehabilitation of concrete bridges, dams, reservoirs, subway tunnels, marine structures and parking ramps.
- Lining and rehabilitation of sewers and water mains.
- New construction including slope stabilization, soil-nailing, shaft and tunnel linings, pools and other concrete structures.

Physical Properties

Test Data Based on 6.0 pints (2.83 L) water	
Set Time at 70°F (21°C) (ASTM C-266)	
Initial Set	7-10 min
Final Set	10-15 min
Compressive Strength (ASTM C-109)	
1 hour	3,200 psi (22.06 MPa)
3 hours	4,500 psi (31.02 MPa)
1 day	6,100 psi (42.05 MPa)
7 days	8,000 psi (55.15 MPa)
28 days	9,000 psi (62.05 MPa)
Bond Strength (ASTM C-882 modified)	
14 days	2,100 psi (14.47 MPa)
Flexural Strength (ASTM C-348)	
4 hours	1,000 psi (6.89 MPa)
28 days	1,450 psi (10 MPa)
Yield	
Yield Per Bag	.40 cu. Ft. (.011 cu. m.)

PROCEDURES

Surface Preparation:

All surfaces to be in contact with PL-8000D must be free from dust, oil, grease or any other foreign substances that may interfere with the bond of the material. Remove all loose or delaminated rock. Clean the area with potable water, leaving the substrate saturated but free of standing water (SSD).

Con^{mic}Shield®, a liquid concrete additive produced by ConShield Technologies, Inc., can be added to the mix water when used in environments producing microbial induced corrosion, such as sanitary sewers.

Application:

Structural Concrete Technology

Permacast Concretes
Advanced Cement Technology
and Proprietary additives that Produce

- Exceptional bonds to Host Surfaces
- Early high Strength System
  - initial set 150 minutes
  - final set 240 minutes
  - compressive strength 3,000 Psi (24 hours)
  - compressive strength 8,000 Psi (28 days)
- Extremely Dense seamless Liner
  - water tight
  - no joints
- Resistance to
  - abrasion and corrosion
  - freeze/thaw cycling
  - chloride penetration
- Manning's *n value*
  - 0.014 – 0.018

City of Chicago
Worlds Largest Maintenance Hole
Restoration Project

AP/M Permacast Lined Structure Remains intact (and reused) after 21" of rainfall collapsed the Street

PL 10000 + ConShield

Time Tested and Performance Proven Technology

FL DOT – Box Culvert

Before

After

Small Installation - Footprint
Traffic Never Stopped

SR64 - Bradenton, Florida

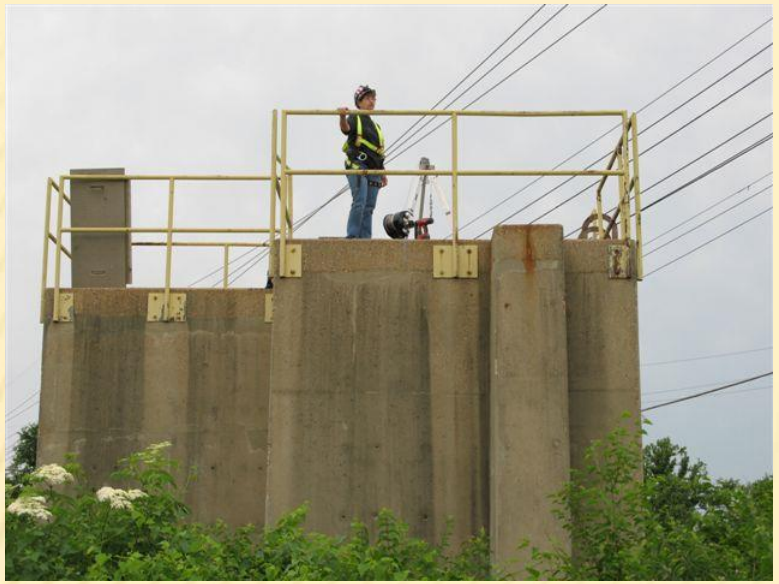
6’ x 6.75’ x 61 Ft Long

OR Dot – Trout Creek Project – 72” Dia CMP x 526’ Lg.

Mount Hood – Oregon Hwy 281

Installation Date: July 2013

Inspection Date: November 2016



Metropolitan St. Louis Sewer District

Maline Drop Shaft

In service (18) Years

MIC Damage – 5” Concrete Loss
After only (3) years of Service

Shotcrete Restoration
Permacast MS 10000 + ConShield

FL Dot – SR 16 – 156” Dia CMP Culvert

Installation Date: March 2010

Inspection Date: November 2016– In service 7 Years

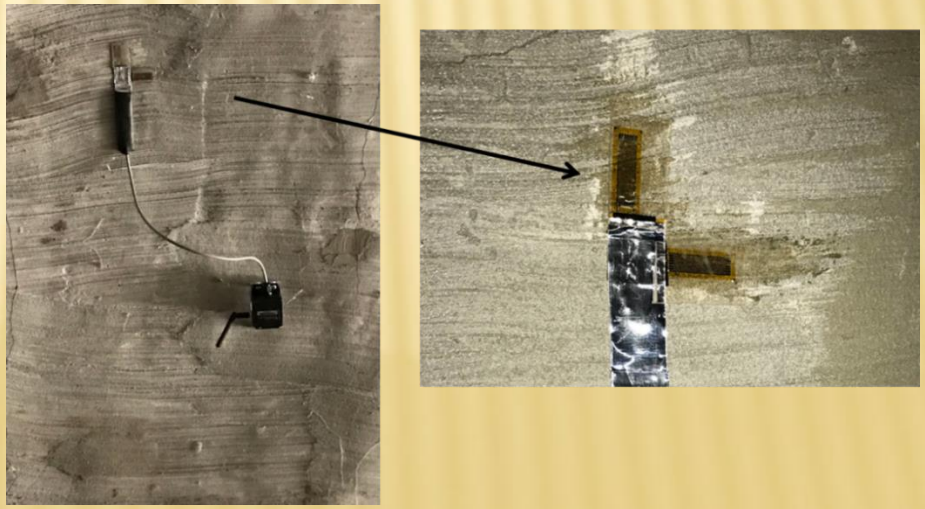
Strain Gauge Testing Overview

On November 21st 2016, a Resensys structural health monitoring system was deployed on SR-16 Clay County Culvert.

The system consists of 4 high rate strain SenSpot sensors and one SeniMax data logger and remote communication gateways.

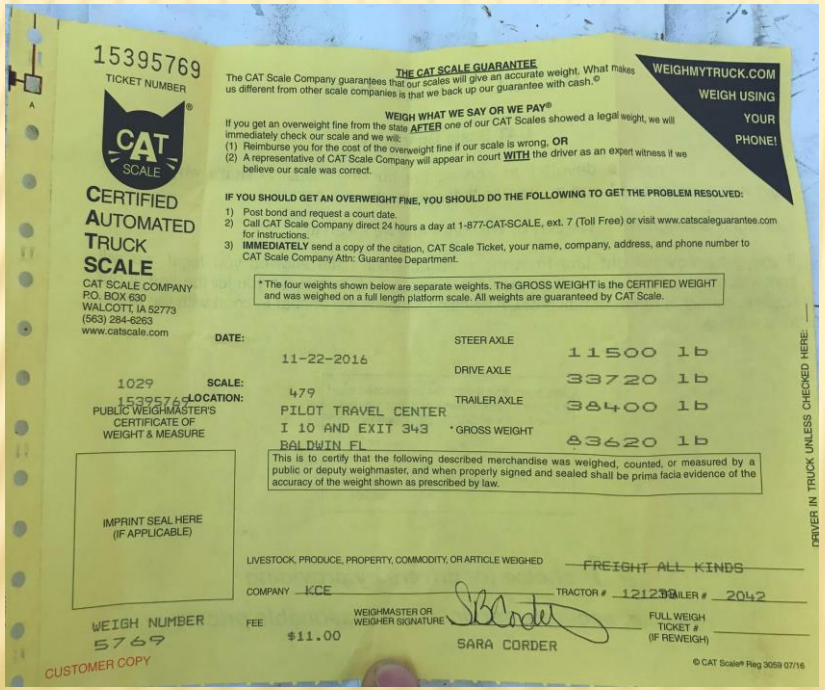
Strain Gauge Sensor:

- Foil strain gauge, SGD-30/120-LY40,
- (by Omega Engineering)
- Half bridge (two perpendicular gauges)
- Amplified by zero drift amplifier
- (gain=125)
- Read by 14-bit ADC
- Resolution, 2microstrains



Load Testing

On November 22nd, 2016 Resensys wireless SenSpot strain sensors were used for load testing using a truck (with known weight of about 83,620 lbs) moving over the culvert at different directions.


15395769
TICKET NUMBER

CERTIFIED AUTOMATED TRUCK SCALE

CAT SCALE COMPANY
P.O. BOX 630
WALCOTT, IA 52773
(563) 284-6263
www.catscale.com

THE CAT SCALE GUARANTEE

The CAT Scale Company guarantees that our scales will give an accurate weight. What makes us different from other scale companies is that we back up our guarantee with cash.©

WEIGHMYTRUCK.COM
WEIGH USING YOUR PHONE!

WEIGH WHAT WE SAY OR WE PAY©

If you get an overweight fine from the state AFTER one of our CAT Scales showed a legal weight, we will immediately check our scale and we will:
(1) Reimburse you for the cost of the overweight fine if our scale is wrong, OR
(2) A representative of CAT Scale Company will appear in court WITH the driver as an expert witness if we believe our scale was correct.

IF YOU SHOULD GET AN OVERWEIGHT FINE, YOU SHOULD DO THE FOLLOWING TO GET THE PROBLEM RESOLVED:

1) Post bond and request a court date.
2) Call CAT Scale Company direct 24 hours a day at 1-877-CAT-SCALE, ext. 7 (Toll Free) or visit www.catscaleguarantee.com for instructions.
3) IMMEDIATELY send a copy of the citation, CAT Scale Ticket, your name, company, address, and phone number to CAT Scale Company Attn: Guarantee Department.

* The four weights shown below are separate weights. The GROSS WEIGHT is the CERTIFIED WEIGHT and was weighed on a full length platform scale. All weights are guaranteed by CAT Scale.

DATE: 11-22-2016
SCALE: 1029
LOCATION: 479
PILOT TRAVEL CENTER
I 10 AND EXIT 343
BALDWIN FL

PUBLIC WEIGHMASTER'S CERTIFICATE OF WEIGHT & MEASURE

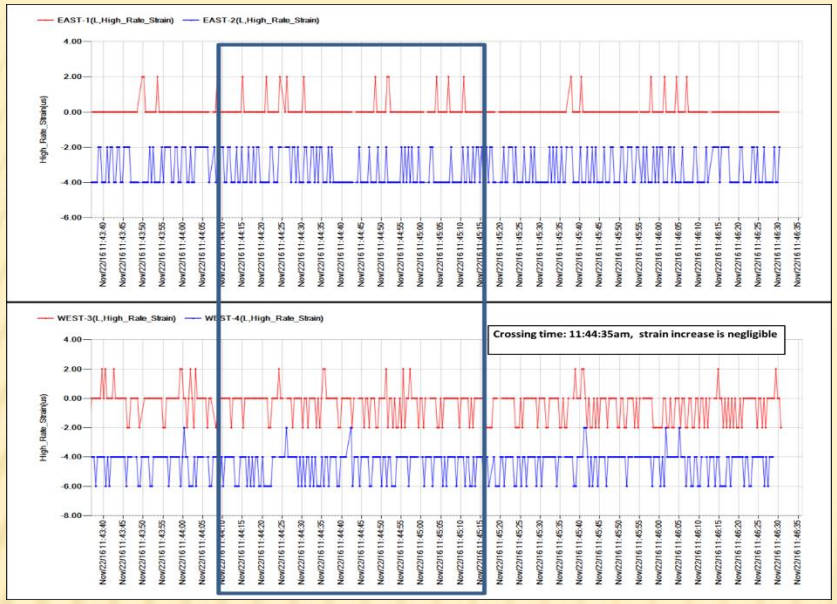
STEER AXLE	11500 lb
DRIVE AXLE	33720 lb
TRAILER AXLE	38400 lb
* GROSS WEIGHT	83620 lb

This is to certify that the following described merchandise was weighed, counted, or measured by a public or deputy weighmaster, and when properly signed and sealed shall be prima facia evidence of the accuracy of the weight shown as prescribed by law.

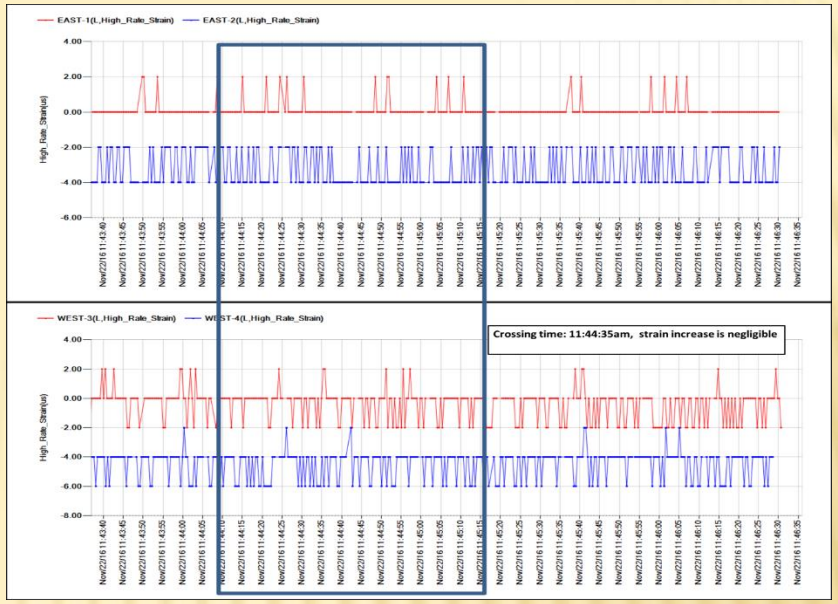
IMPRINT SEAL HERE (IF APPLICABLE)

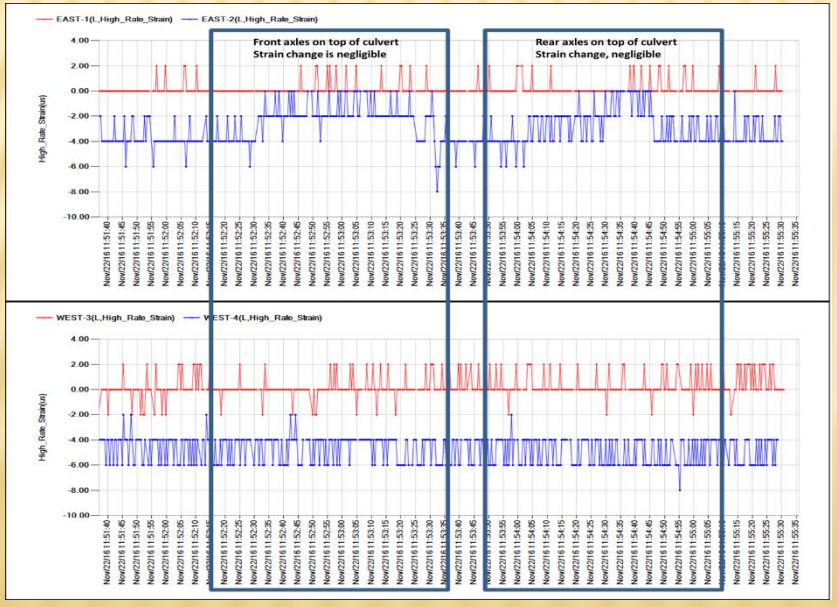
LIVESTOCK, PRODUCE, PROPERTY, COMMODITY, OR ARTICLE WEIGHED: FREIGHT ALL KINDS
COMPANY: KCE
TRACTOR #: 12123 TRAILER #: 2042
WEIGHMASTER OR WEIGHER SIGNATURE: SARA CORDER
FEE: $11.00
FULL WEIGH TICKET # (IF REWEIGH)
WEIGH NUMBER 5769
CUSTOMER COPY
© CAT Scale® Reg 3059 07/16
DRIVER IN TRUCK UNLESS CHECKED HERE:

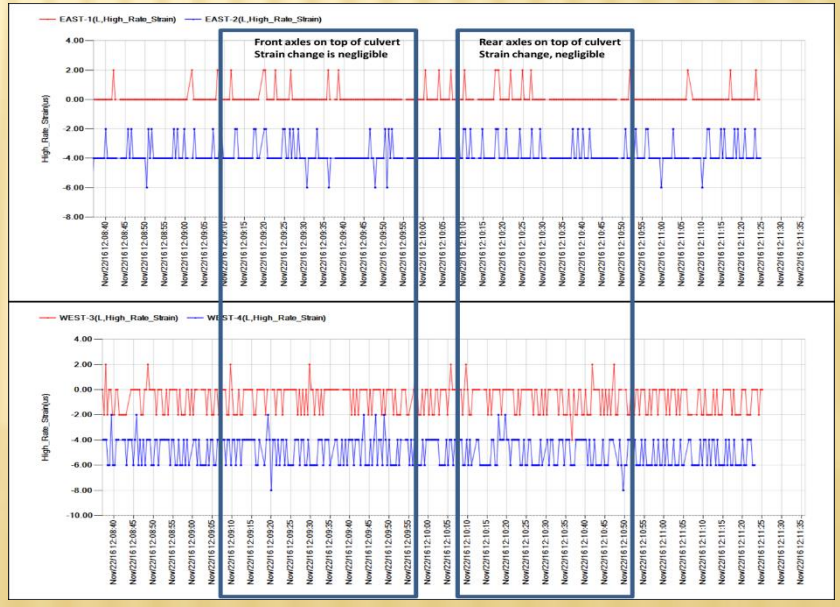
Test 1 – East-Bound @ 3 MPH



Test 2 – West-Bound @ 3 MPH







THANK YOU !

Questions

PL 8000 FAHP Concrete

- Centrifugally Cast
- Wet or Dry Hand Sprayed
- Return to Service = (5) Hours (Prox)

PL 8000D FAHP Concrete

- Dry Hand Sprayed (Guniting) ONLY
- Return to Service = Immediate (15) Min

UNIVERSAL CONSTRUCTION TESTING
a Rediview company

CHICAGO
61 Garlisch Dr.
Elk Grove Village, IL 60007
P 847-459-9090
F 847-459-9015

DALLAS / FT WORTH 972.432.6666
SAN ANTONIO / SO. TEXAS 210.775.1637
AUSTIN / WACO 512.551.0336
HOUSTON 281.446.7363
MIAMI 954.676.4147

Mr. Keith R. Walker, B.A., M.B.A.
Vice President - General Manager
AP/M PERMAFORM
P.O. Box 555
Johnston, IA 50131-0555

keith@permaform.net

Re: **Permacast PL-8000**

Dear Mr. Walker:

Universal Construction Testing, Ltd. (UCT) is pleased to submit a preliminary report with the results for Mix PL 8000 for physical analysis, Lot # 0203-16-21, manufactured on February 03, 2016.

Permacast PL-8000

- **Setting Time ASTM C-266**
  Initial Setting: 170 minutes.
  Final Setting: 300 minutes.

- **Flow Test ASTM C-1437**
  Water ratio of 16.7%, flow is 38%.

- **Compressive Strength ASTM C-109**

Permacast PL-8000 Age	Compressive strength (psi)	Average Compressive Strength (psi)
1 day	5,000	**4,680**
	4,390	
	4,650	
3 days	6,970	**6,990**
	7,020	
	6,980	
7 days	9,580	**9,540**
	9,520	
	9,520	
28 days	10,500	**10,450**
	10,230	
	10,630	

UNIVERSAL CONSTRUCTION TESTING
a Rediview company

CHICAGO
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Elk Grove Village, IL 60007
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DALLAS / FT WORTH 972.432.6666
SAN ANTONIO / SO. TEXAS 210.775.1637
AUSTIN / WACO 512.551.0336
HOUSTON 281.446.7363
MIAMI 954.676.4147

- **Flexural Strength ASTM C-293**

Permacast PL-8000 Age	Flexural Strength (psi)	Average Flexural Strength (psi)
1 day	1,210	**1,200**
	1,180	
7 days	1,345	**1,420**
	1,495	
28 days	1,540	**1,530**
	1,520	

- **Splitting Tensile ASTM C-496**

Permacast PL-8000 Age	Load Average (lbs)	Splitting Tensile (psi)
1 day	33,470	**665**
28 days	42,010	**835**

- **Modulus of Elasticity ASTM C-469**

  Modulus of elasticity at 28 days for 4 inch diameter cylinder 5.26 x 10^6 psi

- **Slant Shear Test ASTM C-882**

Permacast PL-8000 Age	Load Average (lbs)	Slant Shear (psi)
28 days	40,840	**2,890**
	41,120	**2,910**
	40,980	**2,900**

******

We appreciate the opportunity to be of continued service to you.

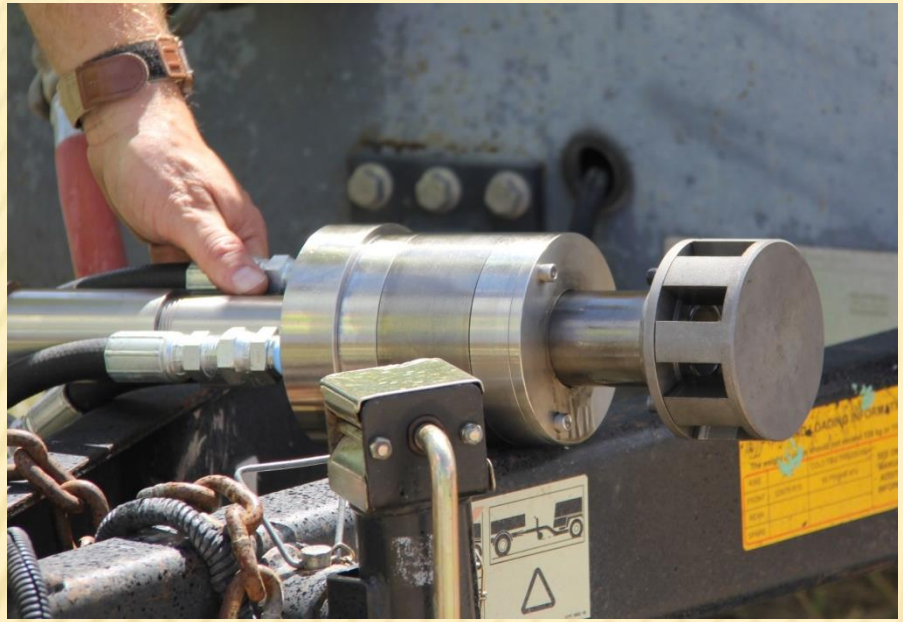
Sincerely yours,
Universal Construction Testing, Ltd.

Elena Emerson

Elena I. Emerson
Director of Laboratory Services

Small Equipment (Installation) Footprint

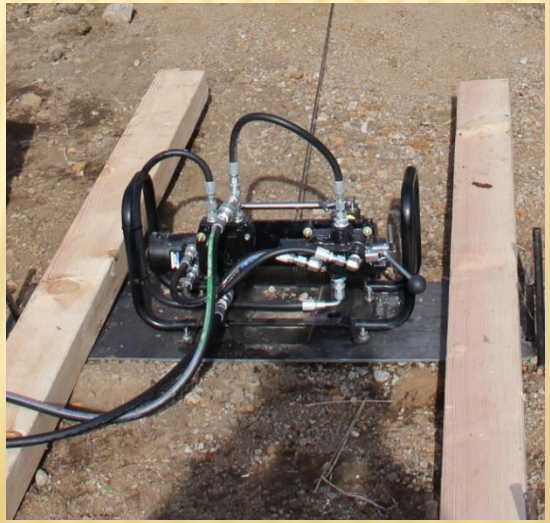
CentriPipe - Contractor Equipment



CentriPipe – Bi-Directional Spincaster

Mortar Mixer – Pump Assembly

CentriPipe – Retrieval Sled



Hydraulic Cable Winch

Support Equipment
(375 CFM Compressor not Shown)

ConShield Video

MIC (Microbially Induced Corrosion)
Bacteria Produced Sulfuric Acid

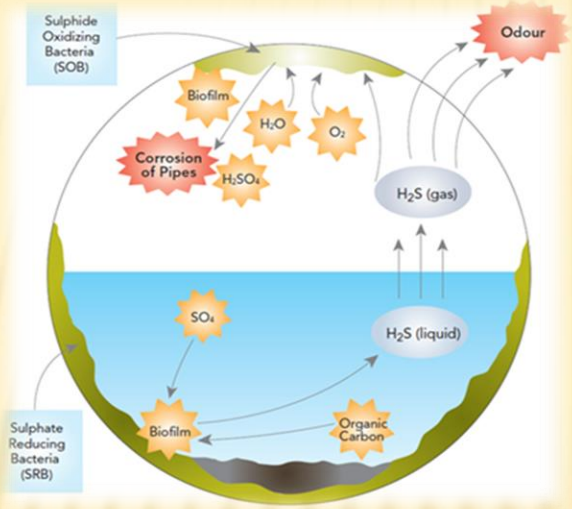
The Bacteria

Thio bacillus Bacteria = a rod shaped gram-positive aerobic Sulphur Oxidizing Bacteria that thrives in sewerage systems and uses various sulfur containing inorganic compounds as an energy source.

H2S is very soluble in water but also will **readily escape as a gas**. As shown in the illustration - a bio-film (slime like coating) forms on the surface of the sewerage system (vessel or pipe), below the waterline. The bio-film contains many strains of bacteria, both aerobic and anaerobic, including **Thiobacillus Bacteria.** This bacteria eventually finds itself on any surface above the water line where it can thrive.

Biogenic Sulfide Corrosion

This is a complex bacterially mediated process of forming hydrogen sulfide gas with a subsequent **conversion to sulfuric acid.** *Fresh domestic sewage entering a wastewater collection system contains proteins including organic sulfur compounds,* ***oxidizable to sulfates (SO $^{2-}$ 4.)*** *The bacteria begin to catabolize the organic materials in sewage, depleting dissolved oxygen. Subsequently, the sulfates are reduced to a combination of 3 sulfides of which one is* ***hydrogen sulfide (H_2S).***



Ultimately, the ***hydrogen sulfide (H_2S) gas is oxidized (again in a complex process) by the*** Thiobacillus Bacteria and along with water vapor produce a dilute aqueous solution of **Sulfuric acid (H_2SO_4 + H20.) T**his corrosive chemical reacts with various compounds in the binder system causing the formation of various complex salts such as calcium sulfate ($CaSO_4 \bullet 2H_20$ - also known as gypsum) on the surface of the concrete. These corrosion by-products will have a punky mush-like appearance, offering zero structural value. They are the after product of the corrosion, not the cause.

How does ConShield prevent Sulfuric Acid from Forming

It kills the Thiobacillus Bacteria instantly upon contact with ConShield Treated Concrete. Much like some ordinary household disinfectants kill bacteria(s) instantly. They too pierce and rupture the bacteria single cell membranes.

Just what is ConShield
ConShield is a silicone quaternary Ammonium Salt (SiQuat)
When it is dosed directly into a concrete mix, it becomes a highly charged cation (positively charged ion) Polymer

ConShield MIC®

Anti – Microbial Liquid Additive
(MIC) Protection
Where ConShield is Used

PreCast Concrete Shapes

Ready Mix - Concrete

ConShield is used By
Licensed AP/M Contractors

Shotcrete – PL 8000 or PL 8000D

Centrifugally Cast (CCCP)
PL 8000

The City of Westlake Ohio

City of Loraine (Neighboring City) Interceptor Sewer Collapse

The City of Westlake Ohio

Installed in 2008 – in Service (10) Years

Before

After

PL 8000 + ConShield

Project Description: 4000 LF of 36” Dia – 60” Dia RCP

Public Bids

CIPP	$ 2,391,102
CCCP (CentriPipe)	$ 783,212

Savings: **$ 1,607,890**

Installation - Mobilization

Small Foot-Print

Rockland County NY

Interceptor Sewer Line
36” RCP x 790’ Long

Before

After

PL 8000 + ConShield
CentriPipe - Centrifugally Cast

Water and Waste Digest
Top 10 Sewer Restoration Projects of the Year Award 2017

Joe Cherry (AP/M Permaform) and

Dennis Sullivan (National Watermain)

MIAMI-DADE, FL

MIAMI-DADE SPECIFIES ANTIMICROBIAL IN MANHOLES

Miami-Dade, Florida, has an area where levels of hydrogen sulfide gas are extremely high. For 17 years, the city has specified ConShield to protect their new precast manholes.

Read on...

Sponsored By: ConShield Technologies, Inc.

https://permaform.sharefile.com/share/view/c9b3ab1b90a34adc

CASE STUDIES


STORM WATER SOLUTIONS

borrowed TIME MANAGEMENT


WaterWorld

Centrifugally Cast Pipe Repair Resolves Storm Sewer Challenge


underground


STORMWATER

Turnaround Strategies


WATER & WASTES DIGEST

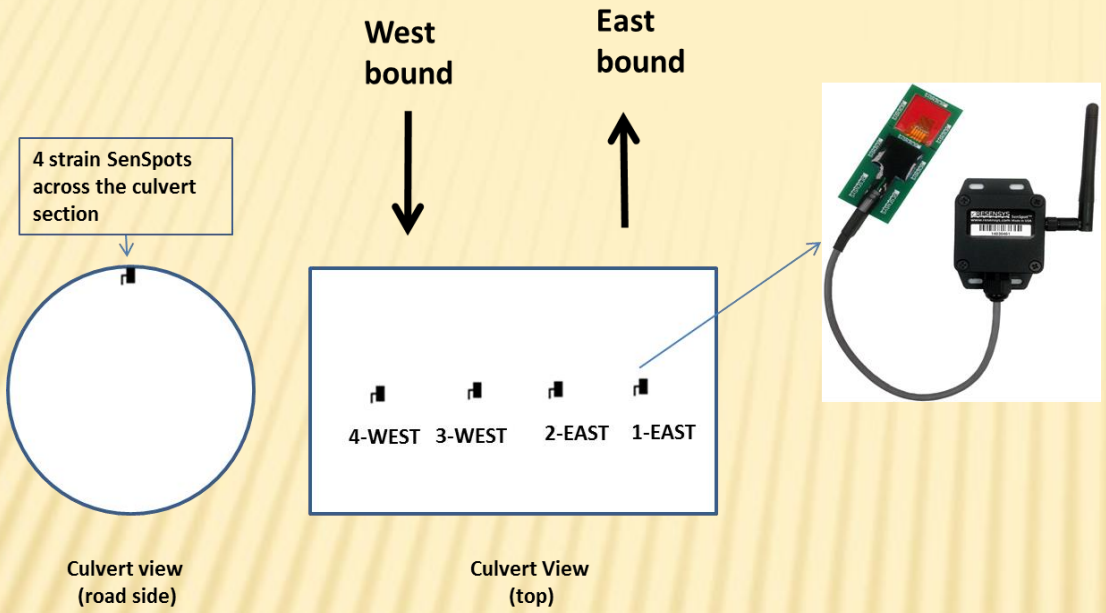
40 Feet Deep & About to Fall

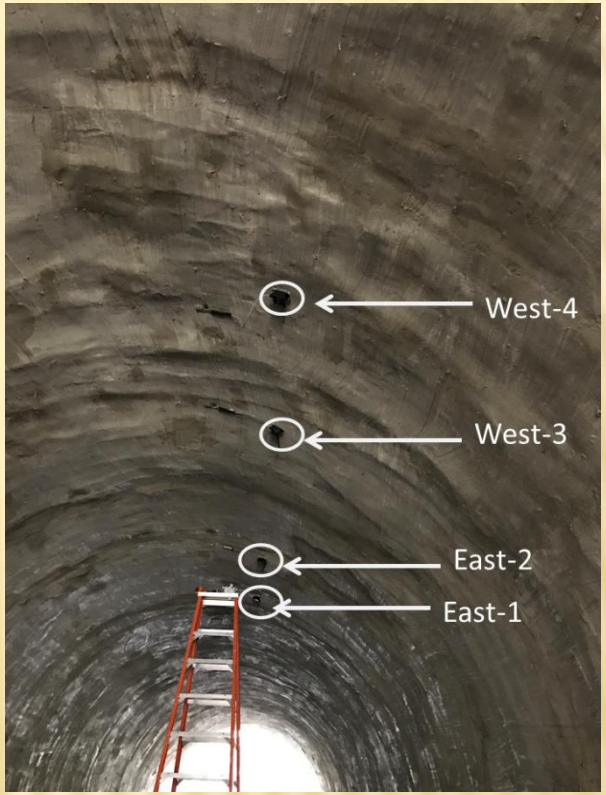
Trade Journal Articles and Owner Testimonials

Numerous Articles on our Web-Site

www.centripipe.com

Location of Strain Gauges





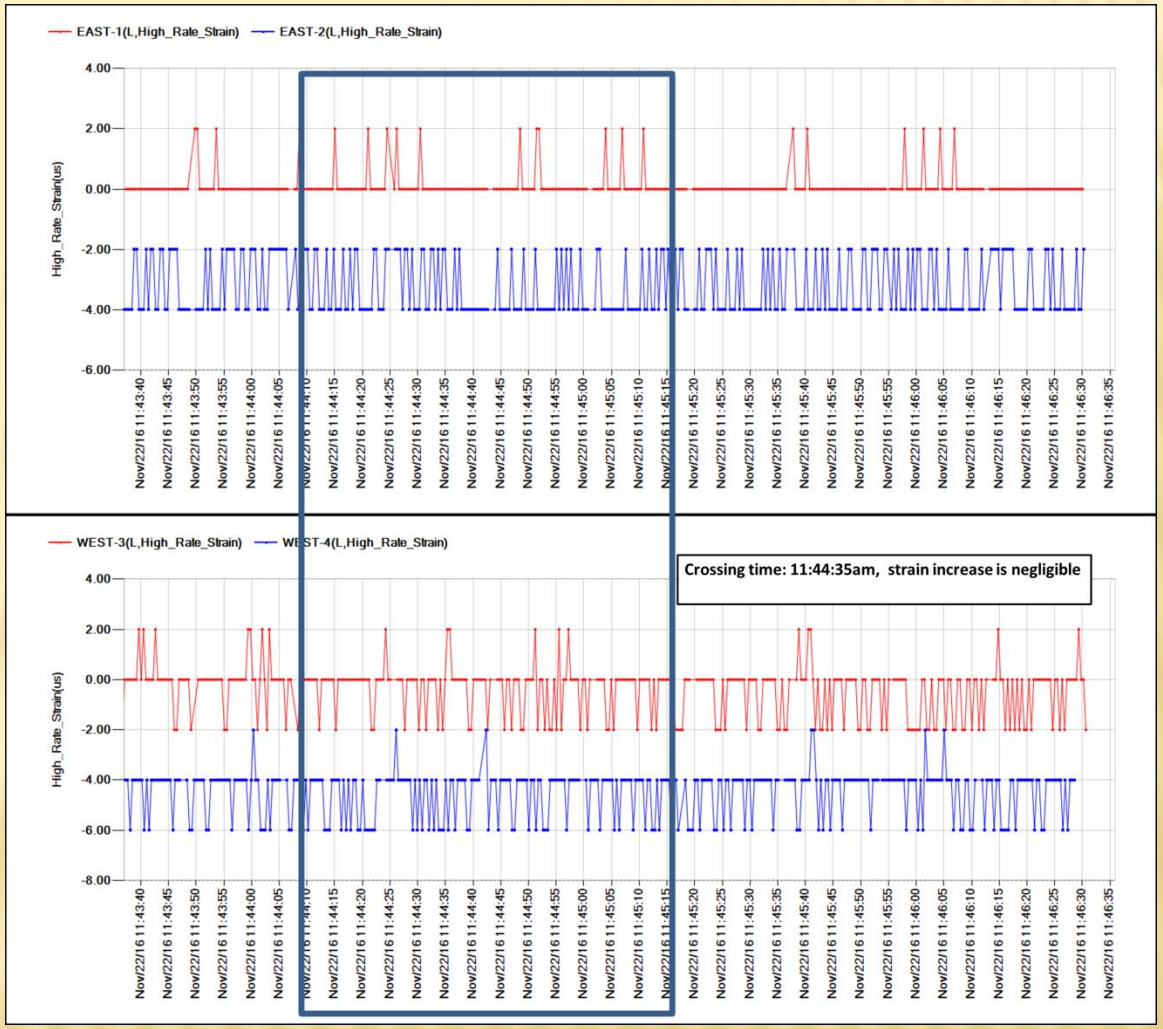
Remote Communication Gateway (data collected and recorded) →

Westbound Traffic – Rolling Speed – 3 MPH

Load Rating Test 2

Truck moved over the culvert West-Bound traffic on Nov 22rd, 2016 11:44:45 AM with a speed of 3 MPH.

Result: No significant change in strain was observed

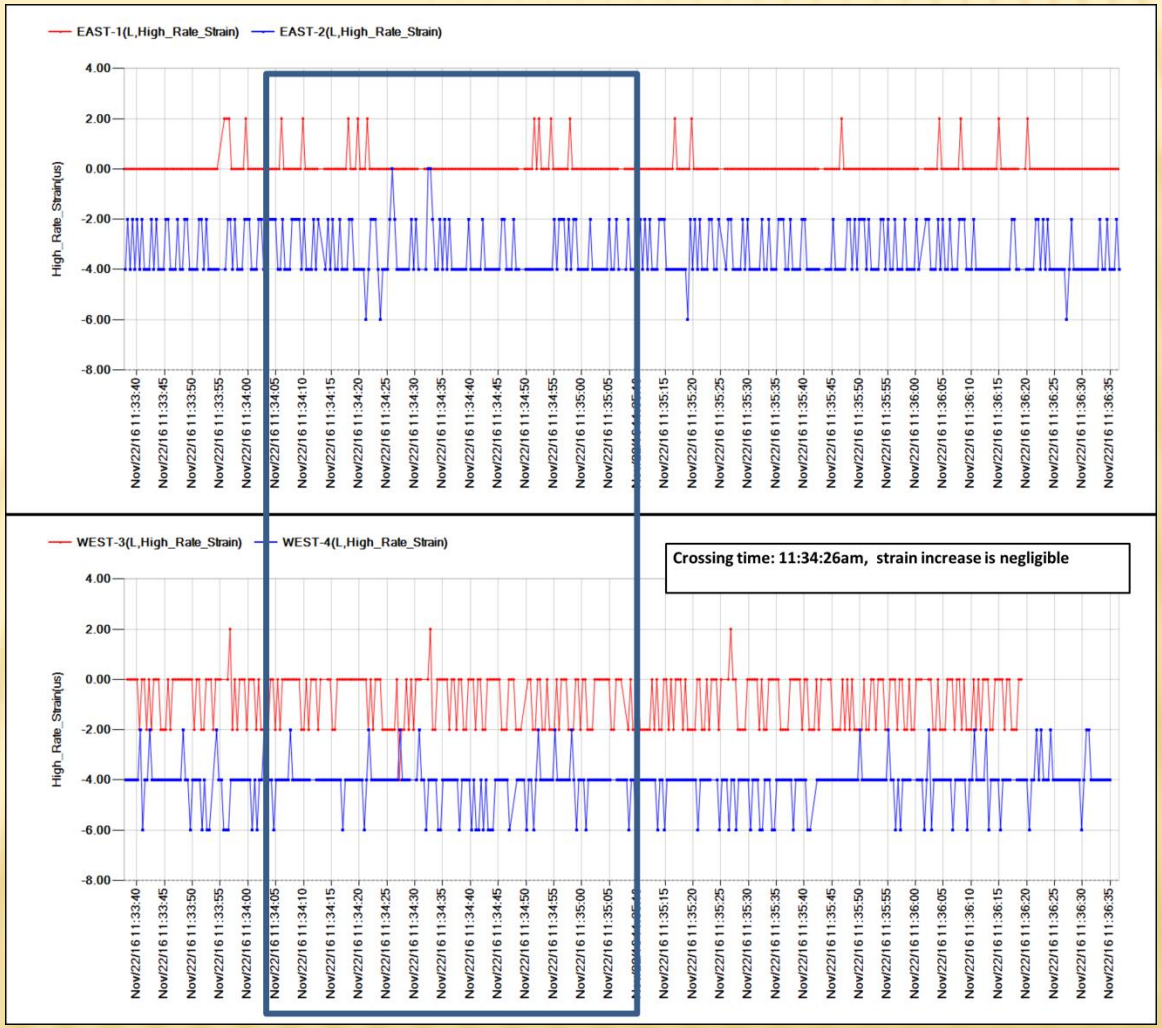


Eastbound Traffic – Rolling Speed – 3 MPH

Load Rating Test 1

Truck moved over the culvert East-Bound traffic on Nov 22rd, 2016 11:34:26 AM with a speed of 3 MPH.

Result: No significant change in strain was observed

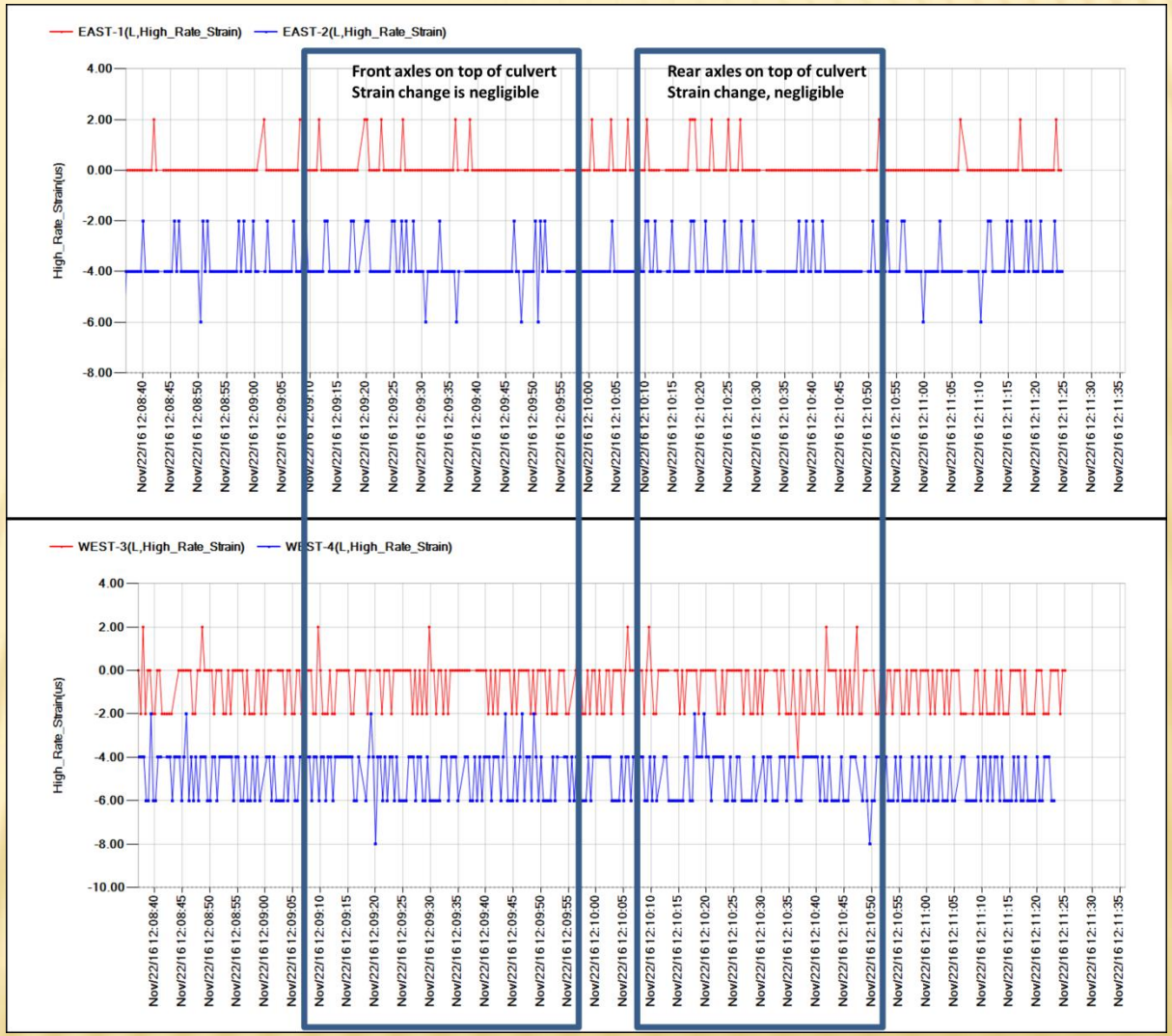


Westbound Traffic – Front and Rear Axles – Stopped on Top of Pipe

Load Rating Test 4

Truck moved over the culvert West-Bound traffic on Nov 22rd, 2016 12:08 AM. Truck stopped with front axles on top of culvert on 12: 09 AM and rear axles on 12:10 AM.

Result: No significant change in strain was observed

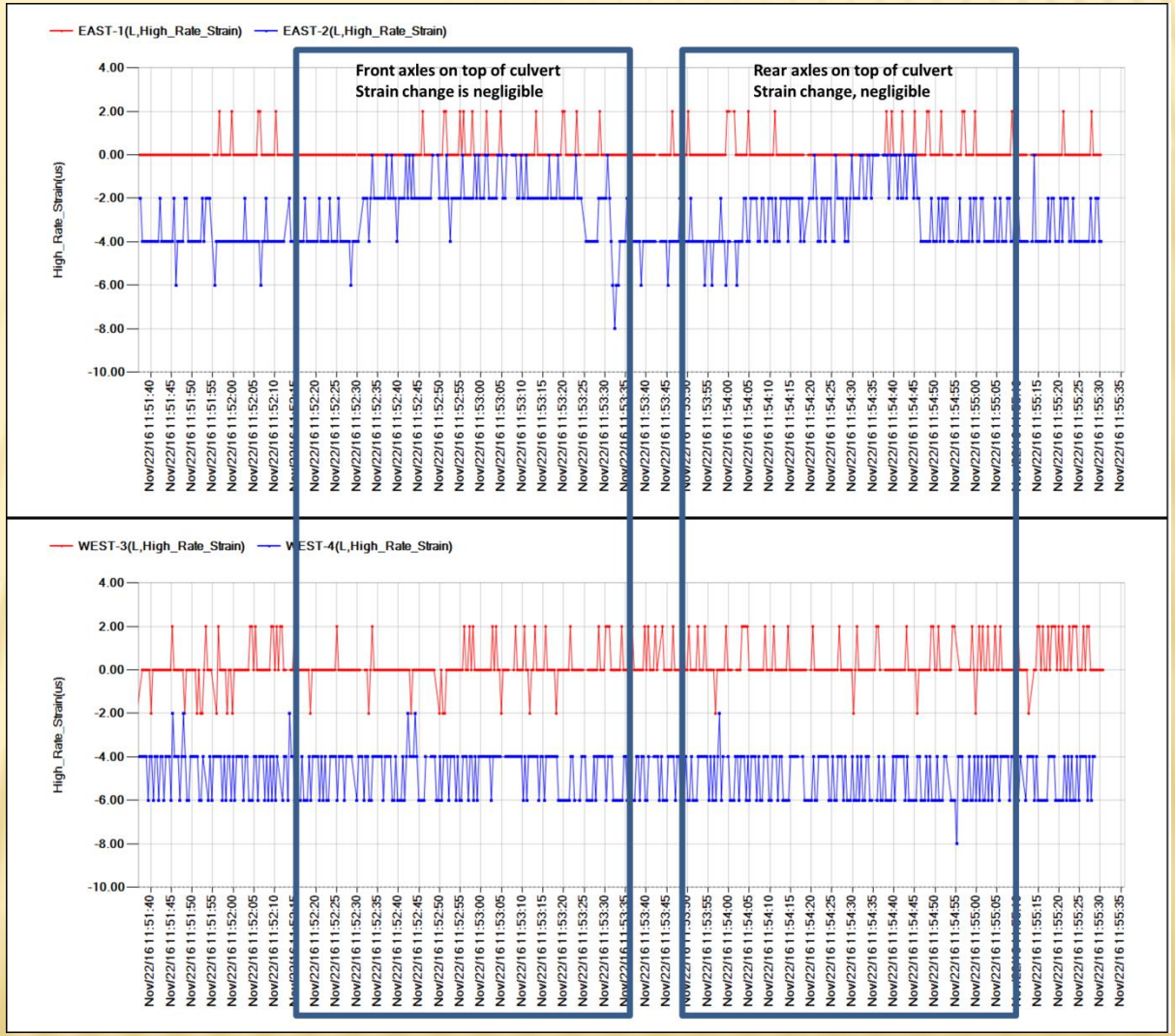


Eastbound Traffic – Front and Rear Axles – Stopped on Top of Pipe

Load Rating Test 3

Truck moved over the culvert East-Bound traffic on Nov 22rd, 2016 11:50 AM. Truck stopped with front axles on top of culvert on 11: 52 AM and rear axles on 11:54 AM.

Result: East-2 strain SenSpot sensor shows 2-4 microstrain increase in strain and for the other three strain SenSpot sensors no significant change in strain was observed



Conclusion

Live load effect:

No strain change has been caused by traffic (live load).

Generally, live load (e.g., passing of heavy trucks) can result in transient (spike-like) strain change events. However, inspection of the strain graphs during the reporting period does not show any transient strain change.

••This implies the safe load carrying capacity of the structure under the existing traffic conditions. In addition, this observation is consistent with the truck test loads conducted on November 22 2016. As a result it is logical to assume that the structure can carry loads up to (and possibly even larger than) the weight of the truck used for conducting the tests.

RIO TINTO MINES – Heavy Rail System

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PO Box 25, Thuringowa Central,
QLD, 4817

Tel: +61 7 4725 5874
Fax: +61 7 4725 5879

www.rocktech.com.au

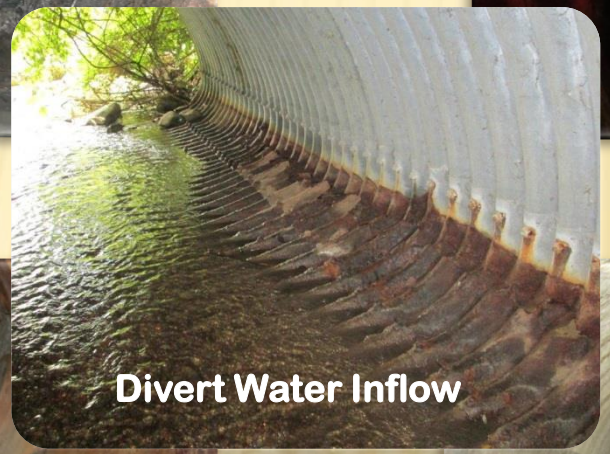
Centripipe Third Party Review

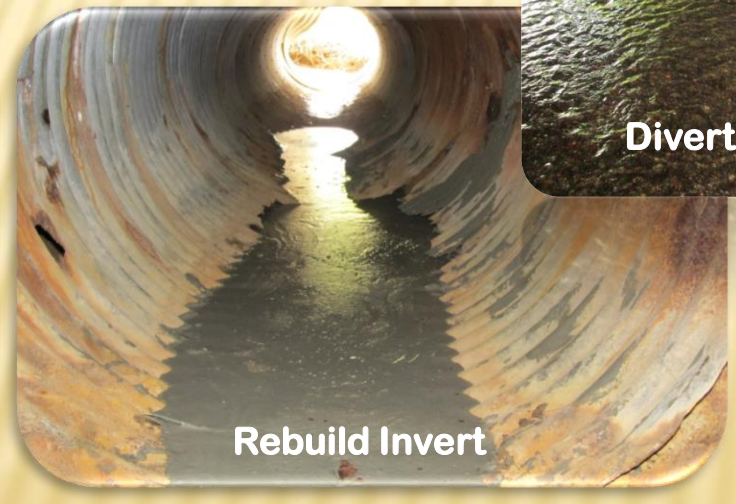
Prepared for:

TCD Group

Project No:	R1706007
Document No:	R1706007 – R1
Issue Date:	4/05/2018
Revision:	2

ESTIMATING A PROJECT





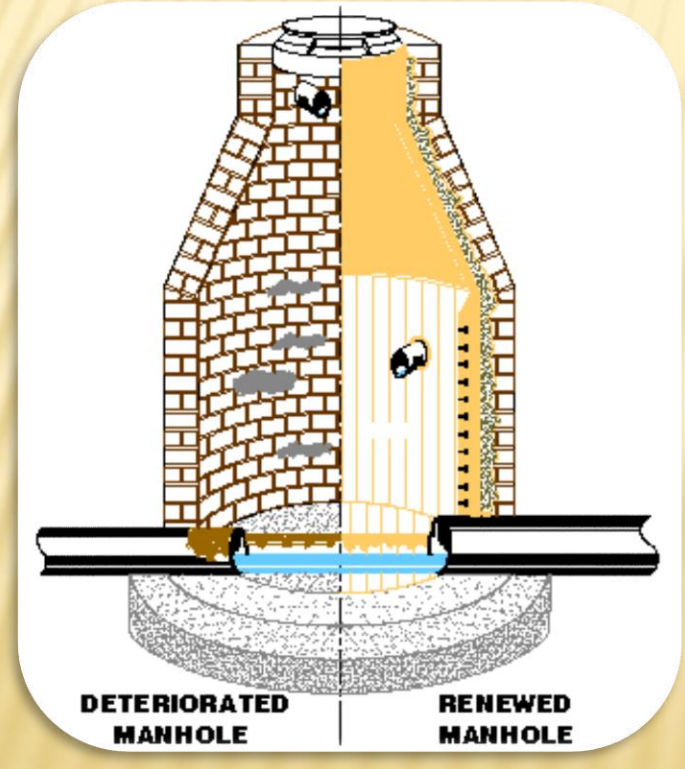
Ball Park Costs = $ 5.00 to $ 10.00 Inch dia Foot

ENGINEERING DESIGN GUIDES

CONDENSED DESIGN GUIDE
for
TRENCHLESS MANHOLE RENEWAL

with

PERMACAST® / PERMAFORM®
TECHNOLOGY



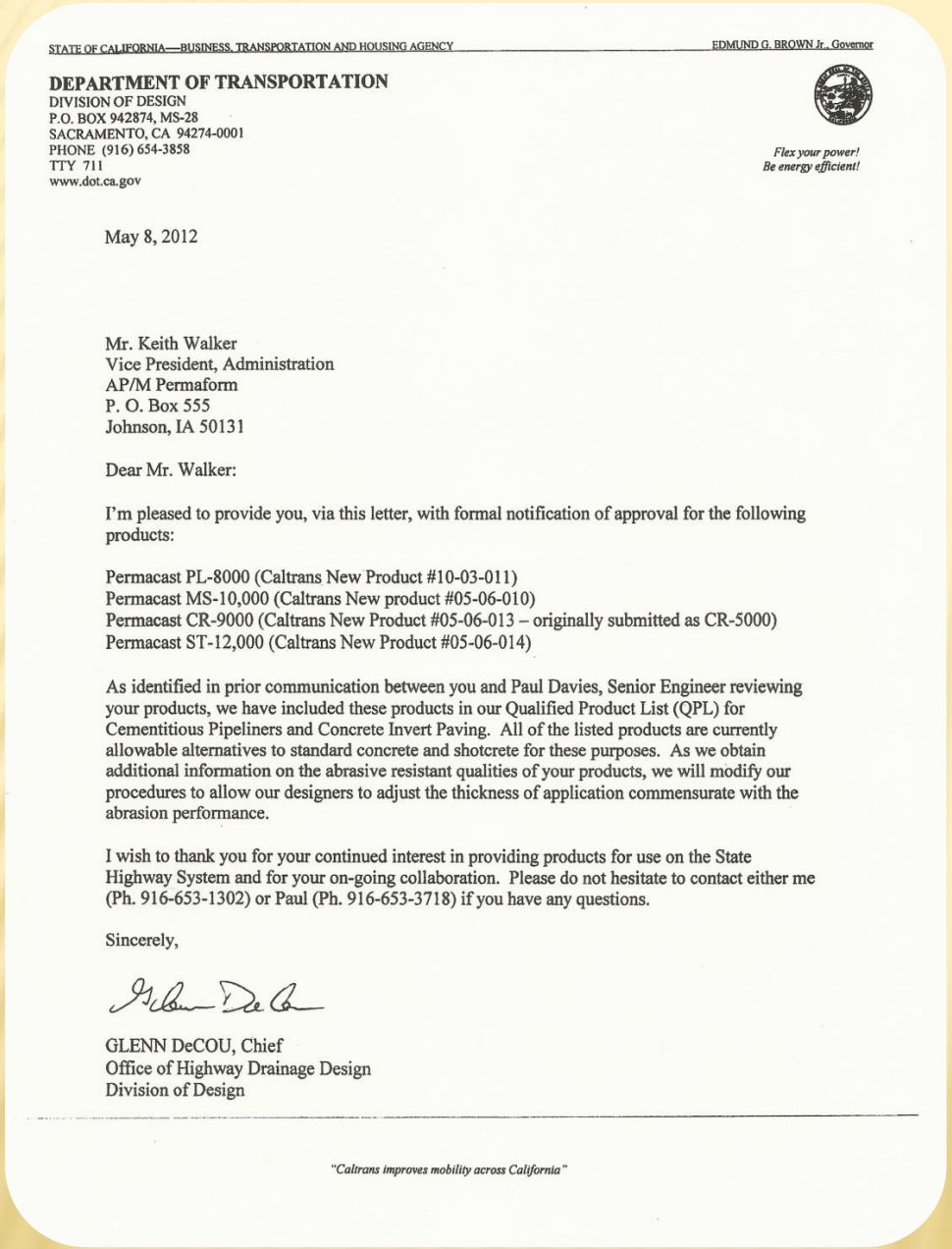
ENGINEERING DESIGN GUIDE
for
TRENCHLESS PIPE and CULVERT RENEWAL

using the

CENTRIPIPE SYSTEM

(electronic files available upon request)

Crystal X Video



STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY — EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DIVISION OF DESIGN
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TTY 711
www.dot.ca.gov

Flex your power!
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May 8, 2012

Mr. Keith Walker
Vice President, Administration
AP/M Permaform
P. O. Box 555
Johnson, IA 50131

Dear Mr. Walker:

I'm pleased to provide you, via this letter, with formal notification of approval for the following products:

Permacast PL-8000 (Caltrans New Product #10-03-011)
Permacast MS-10,000 (Caltrans New product #05-06-010)
Permacast CR-9000 (Caltrans New Product #05-06-013 – originally submitted as CR-5000)
Permacast ST-12,000 (Caltrans New Product #05-06-014)

As identified in prior communication between you and Paul Davies, Senior Engineer reviewing your products, we have included these products in our Qualified Product List (QPL) for Cementitious Pipeliners and Concrete Invert Paving. All of the listed products are currently allowable alternatives to standard concrete and shotcrete for these purposes. As we obtain additional information on the abrasive resistant qualities of your products, we will modify our procedures to allow our designers to adjust the thickness of application commensurate with the abrasion performance.

I wish to thank you for your continued interest in providing products for use on the State Highway System and for your on-going collaboration. Please do not hesitate to contact either me (Ph. 916-653-1302) or Paul (Ph. 916-653-3718) if you have any questions.

Sincerely,

GLENN DeCOU, Chief
Office of Highway Drainage Design
Division of Design

"Caltrans improves mobility across California"

CENTRIPIPE™

States – Qualified Product List (QPL)

California
Colorado
Florida
Georgia
Kentucky
Louisiana
Maryland
Nebraska
New York
North Carolina
Oklahoma
Oregon
Alberta Canada
Others in Process

States – CentriPipe Installed

Approvals Pending

Alabama – Indiana – Utah

(copies available upon request)

CentriPipe FAHP Concrete Materials approved for use by Caltrans

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Sincerely,

GLENN DeCOU, Chief
Office of Highway Drainage Design
Division of Design

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ConShield – Registered and approved for use by California DPR

dpr **Department of Pesticide Regulation**

Brian R. Leahy
Director

Edmund G. Brown Jr.
Governor

July 20, 2017 — ID# 274722

ConShield Technologies, Inc.
541 Tenth Street, NW #233
Atlanta, Georgia 30318

Dear Registrant:

Registration of the following product(s) was effective July 20, 2017:

CON MIC SHIELD HD
EPA Reg. No. 75174-7-AA-73453

This registration action is based on compliance with provisions of California laws and regulations pertaining to pesticide registration. Your certificate of registration (license) and a stamped copy of the product label(s) are enclosed.

If your product contains a fertilizer, soil amendment, or commercial animal feed, you should contact the California Department of Food and Agriculture (CDFA) for further information. If your product is a bacteriostatic water filter, you should contact the State Water Resources Control Board (SWRCB). If your product is a medical waste treatment product, you should contact the California Department of Public Health (CDPH).

Sincerely,

Aron Lindgren
Regulatory Scientist
Pesticide Registration Branch
916-324-3950
E-mail: Aron.Lindgren@cdpr.ca.gov

Enclosures

cc: Kevin Kutcel, Agent

1001 I Street • P.O. Box 4015 • Sacramento, California 95812-4015 • www.cdpr.ca.gov

A Department of the California Environmental Protection Agency

Printed on recycled paper, 100% post-consumer–processed chlorine-free.

LA – Cor+Gard Pickle Jar Test and Approval

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LOS ANGELES, CA 900 5 3213

http://eng.lacity.org

February 8, 2017

Keith R. Walker
AP/M Permaform
PO Box 555
Johnston, IA 50131

SUBJECT: AP/M Permaform Cor+Gard

Dear Mr. Walker,

Your request to renew the City-wide approval of AP/M Permaform Cor+Gard Type II liner corrosion barrier has been received and approved for use on concrete or mortar surfaces only. The new expiration date is February 8, 2019.

The City assumes no responsibility for any and all safety related issues in regards to the installation and use of this product. It is the responsibility of the installer to understand the appropriate use and limitations of this product and to address any and all safety concerns with the manufacturer. Further, it is the installer's responsibility to conform to all applicable industry and regulatory safety requirements.

If you would like your product to be listed on the Approved Product Tracking System after the approval expiration date, and the product's material formulation has not changed, you will need to comply with the approval renewal requirements for Type II Liners. You must submit the following at least 90 calendar days before the date on which your approval will expire: a letter verifying that there have been no changes to the material composition since the product was last tested by the City. Submissions will be evaluated by City engineering staff and, if the submission are considered satisfactory, a two-year extension will be granted.

Please be advised that any change in material must be reported to us for consideration of compliance with the specifications. If you have any questions, please contact Kent Welling at (213) 485-5405, or Edward Arrington at (213) 485-7694.

Sincerely,

Edward Arrington, S.E
Engineer of Design
Wastewater Conveyance Engineering Division

c.c.: File

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Johnston, IA 50131

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This Certificate Certifies that,

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attended the,

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DESIGN SEMINAR for the
TRENCHLESS RESTORATION OF WASTE AND STORM WATER SYSTEMS
and has earned .75 PDH (Professional Development Hours)

on January 17, 2019 – Waterford, Michigan

_____

(attendees signature)

541 Tenth Street NW
Suite 233
Atlanta, GA USA 30318

Professional Development Hours Certificate

This Certificate Certifies that,

_____

attended the,

CONSHIELD TECHNOLOGIES

DESIGN SEMINAR for the
CAUSES and METHODS for COMBATING
MIC (Microbially Induced Corrosion)
and has earned .75 PDH (Professional Development Hours)

on January 17, 2019 – Waterford, Michigan

_____

(attendees signature)

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