VCS ENGINEERING

Infrastructure Durability Experts™

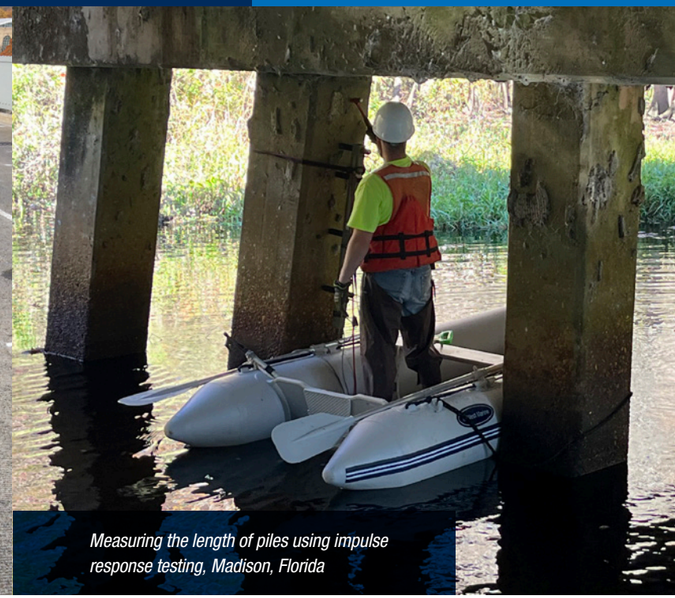
STATEMENT OF QUALIFICATIONS

- Cathodic Protection
- Durability Consulting
- Post-Tension Services
- Non-Destructive Testing
- Corrosion Assessment
- StructureView® Monitoring

Non-destructive Testing and Condition Assessments

Niagara Falls Rainbow Bridge corrosion assessment and non-destructive testing

Rainbow Bridge deck assessment with ground penetrating radar (GPR), Niagara Falls, New York



Measuring the length of piles using impulse response testing, Madison, Florida

VCS OVERVIEW

VCS specializes in extending the service life of existing and new structures through non-destructive testing, corrosion engineering, material science, cathodic protection design and structural health monitoring services.

As part of your design team, VCS gains a thorough understanding of service life objectives and budget. Utilizing the most modern tools and techniques, our engineers and technicians perform an on-site evaluation and develop a sound understanding of the cause and extent of deterioration.

Once we define the durability challenges facing your structures, our experience allows us to implement practical, cost-effective repair and rehabilitation solutions, even in the most severe environments.

COMPANY PROFILE

- Incorporated in 2014 in the State of Florida
- Corporate office in Tampa, FL. with branch offices in Massachusetts, Michigan, Illinois, South Carolina, South Florida, the United Kingdom and Canada
- Over 500 projects completed
- Over 20 employees including the NDT Corporation subsidiary
- Registered professional engineers in over 25 States
- Certified Small Business with the U.S. Small Business Administration
- Certified small business enterprise for professional engineering consulting services with the South Florida Water Management District (SFWMD)
- NACE certified cathodic protection specialists and technicians
- Members of ACI International, ASCE, ICRI, PTI, AMPP and AAPA

Crystal Sands condominium balconies CP design, QC and monitoring

Siesta Key Bridge piles StructureView® monitoring of CP jackets

- Concrete sampling and testing
- Corrosion rate testing
- Corrosion potential surveys
- Ground penetrating radar surveys
- Infrared thermography
- Impact echo and pulse velocity
- Borescope inspection
- Post-tension system investigation services
- Ultrasonic thickness

VCS engineers and technicians have significant training and experience in the use of non-destructive test methods on infrastructure to assess the cause and extent of deterioration.

Standard inspection techniques like visual and hammer sounding can only find near-surface, late-stage deterioration. To test a structure to identify areas of current and future deterioration, VCS implements various non-destructive methods. This provides a better understanding of the structure so VCS can evaluate various repair strategies for their effectiveness and efficiency.

Impact echo/pulse velocity testing of a hangar at the Kansas City Airport

Corrosion potential survey of a pier in St. John's, Antigua

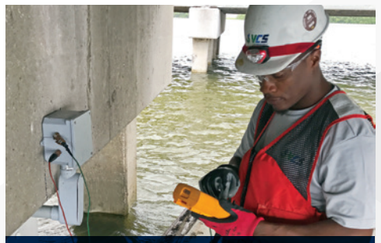
Cathodic Protection Consulting

Parcel 1B building foundation, impressed current cathodic protection system for new construction

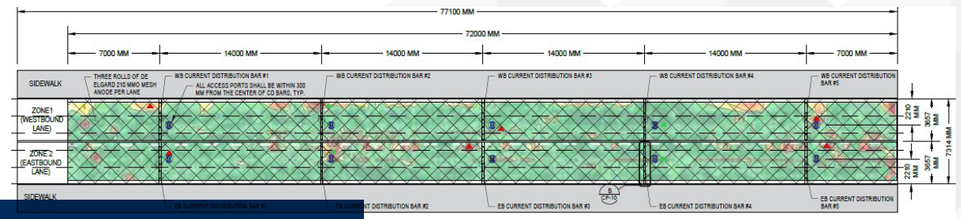
- Design of galvanic and impressed current systems
- Materials and equipment selection
- Contract document preparation
- QA/QC services
- Contractor training and support
- Commissioning
- On-site and remote monitoring
- Cathodic protection system troubleshooting

VCS engineers and technicians are nationally renowned experts in cathodic protection (CP) of infrastructure. VCS has designed a myriad of galvanic and impressed current systems that have been used in a variety of applications and environments. VCS is also on the forefront of two-stage anode technology, using both galvanic and impressed current CP in the same application.

VCS engineers and technicians also perform construction installation support, verification of proper installation and evaluation of existing CP systems. VCS staff provide support to make sure that CP systems are properly installed and provide proper corrosion mitigation.



Pinellas Bayway bridges cathodic protection quality control



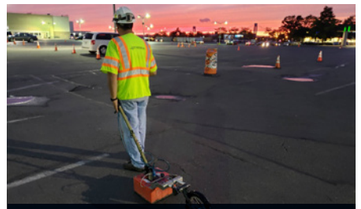
Design of a impressed current cathodic protection deck overlay, Courtenay, British Columbia

Geophysical Testing

Seismic refraction survey assessing soil layers and rock elevations

Automated concrete rail-tie testing (implementing non-contact sensors)

- Refraction survey
- Bedrock profiling
- Utility location services
- Vertical seismic profiling (downhole)



Locating underground utilities using ground penetrating radar

NDT CORPORATION

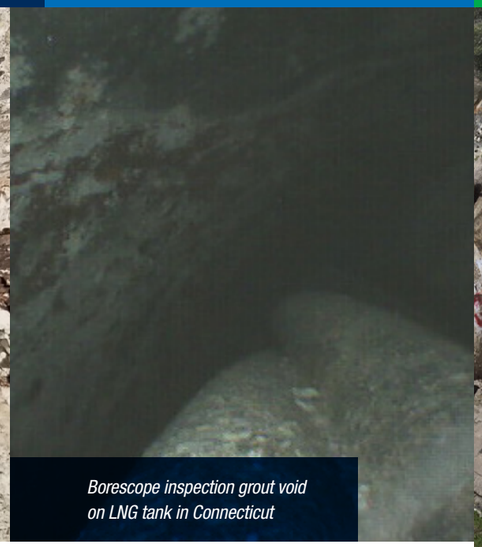
Concrete & Geophysical Testing

In 2017, VCS acquired NDT Corporation (NDT Corp.) a Sterling, MA based testing firm founded in 1994 to expand our footprint in the non-destructive testing field. NDT Corp. has been a pioneer in the development of specialized equipment to non-destructively evaluate reinforced concrete and post-tensioned structures. NDT provides engineers with processional, high-resolution, non-destructive, concrete, and geophysical testing services. The results of the investigations provide engineers and infrastructure owners quantitative data to make replacement decisions or implement proactive and efficient rehabilitation strategies.

NDT Corp. specializes in geophysical testing to understand subsurface conditions. This includes mapping soil stratification, identifying the extent and layout of unknown structure foundations, and locating utilities.

Post-Tension Services

Chloride contaminated tendon 5th Street bridge in Calgary, AB



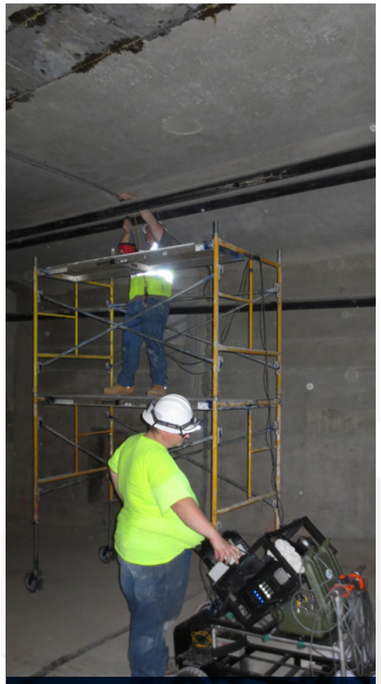
Borescope inspection grout void on LNG tank in Connecticut

VCS has a reliable and effective approach to assessing PT tendons that includes technologies and techniques that have been developed over many years of experience.

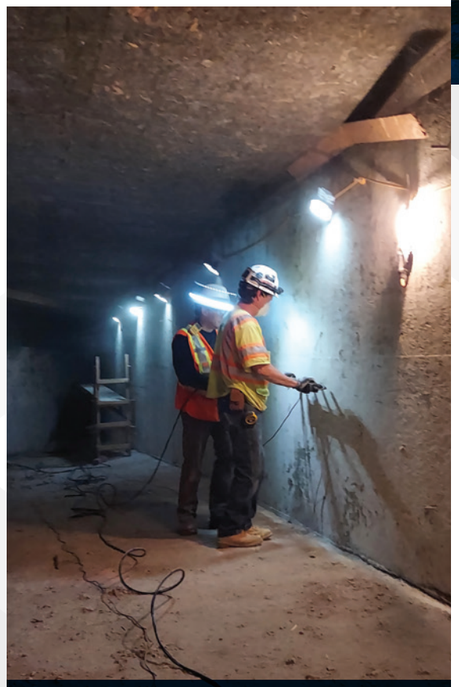
- Evaluation of both internal and external tendons
- Non-destructive evaluation of post-tensioning to locate grout defects
- Evaluation of bonded and unbonded systems
- Borescope inspection of defects
- Laboratory analysis of grout specimens
- Design of corrosion mitigation methods to prevent further deterioration

Throughout the world, voids and soft grout problems have been found within post-tension (PT) ducts due to improper/ineffective grouting during construction. These grouting defects often create environments within the ducts that promote corrosion of the high strength steel strands. The major challenge with PT grout defects is that they cannot be identified through standard bridge inspections methods like visual and sounding inspection. As a result, issues in the grout are often unidentified until advanced deterioration has occurred.

VCS has located and assessed grout defects and corrosion activity on many PT bridges throughout North America.



Acoustic testing of external tendon for grout defects, Sarasota, FL



Post-tension void detection using sonic/ultrasonic testing and ground penetrating radar, Orangethorpe, CA

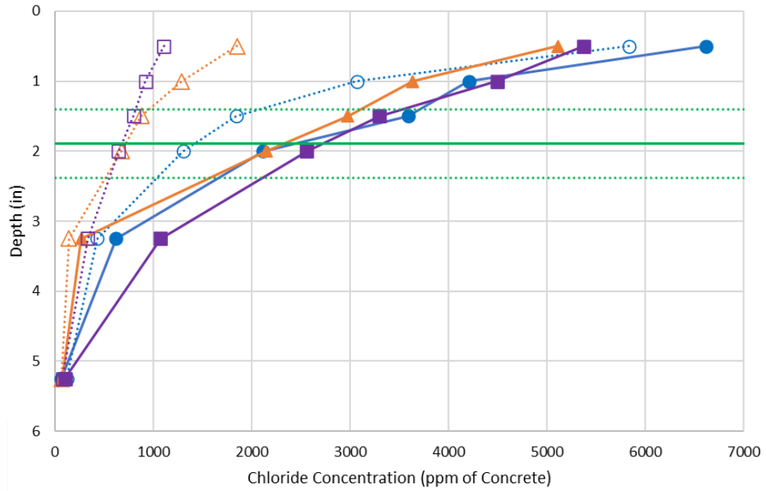
Durability

Assessment of alkali silica reaction in the concrete of the Mineral King bridge in Tulare County, CA

Petrographic examination of concrete suffering from alkali silica reaction

- Concrete design and troubleshooting
- Laboratory analysis of concrete and steel samples
- Durability modeling
- Asset management
- Life cycle cost analysis
- Mass concrete thermal analysis
- Service life modeling

Durability is of critical concern for civil infrastructure, and with many structures in harsh environments meeting the required service life can be challenging. In addition, 100-year service life requirements are becoming more common. Having experts in reinforced concrete critical for a well-rounded design team. VCS engineers can support in the selection of materials and repair procedures that will provide the necessary service life for a structure. VCS can also inspect existing structures, determine the amount of service life that is remaining, and help develop rehabilitation strategies that will extend the service life as required.



Chloride diffusion profiles of chloride in concrete

Monitoring Solutions

Siesta Key Bridge StructureView® monitoring of cathodic protection jackets

STRUCTUREVIEW®

In 2016 VCS introduced the StructureView® remote monitoring system. StructureView® is a robust data acquisition system connected to an internet portal that allows customized sensor configuration for a wide range of applications like cathodic protection systems, environmental conditions, and structural response.

Uses & Benefits

Monitoring solutions are designed for temporary or permanent installation in new construction or existing structures.

- Determine in-place performance
- Validation of design and modeling
- Develop and verify repair strategies
- Monitor construction impact on adjacent structures
- Hazard monitoring for increased safety
- Early detection of deterioration

Remote Access

Many projects will benefit from the capability of remote access to locally collected data.

- Web interface
- Automated data collection
- Cloud based data storage
- Display and analyze data online or in PDF format
- Programmable alarms with email & SMS alerts
- Secure access and tiered user credentials
- Reduced inspection costs

Corrosion Monitoring

Corrosion is a significant deterioration mechanism that impacts service life. The system uses monitoring to alert the onset of corrosion or to determine corrosion progression over time.

Cathodic Protection Monitoring

Cathodic protection monitoring measures the performance and determines the service life of galvanic and impressed current cathodic protection systems.

Structure Monitoring

Structural monitoring measures stress, strain, deflection, rotation, and how infrastructure performs and responds to the environment over time.

Construction Site Monitoring

Construction site monitoring analyzes environmental conditions on the job site and the effect of construction activities on adjacent structures for reduced risk and improved safety.

Health, Safety and the Environment

Saint Petersburg Pier service life assessment

VCS is committed to providing high-quality service in a manner that ensures a safe and healthy workplace for our employees and minimizes our potential impact on the environment.

Our commitment at VCS is to prevent injury to workers, damage to equipment and property, and to protect the customer, the public, and the environment from accidents. We hold the personal safety and health of each employee of primary importance.

Our objective is to maintain a health and safety policy that will reduce the number of injuries and illnesses to an absolute minimum. Our goal is zero accidents and injuries.

VCS has a defined corporate safety policy

- Drug and alcohol free workplace
- Pre-employment background checks
- Pre-employment and random drug screening
- OSHA 10-hour training
- Task specific safety training
- SafeStart® safety awareness program

Cement storage silos corrosion investigation and damage survey

Hume Lake Dam non-destructive evaluation with impact echo and infrared thermography

List of Representative Projects

BRIDGES/TUNNELS/CULVERTS

Year	Project	Customer	Location	Corrosion Assessment	CP Design	CP QA/QC	Durability Consulting	Structural Monitoring
2022	Fifth Street Bridge	Vector Construction	Courtenay, BC	x	x	x		x
2021	Hampton Roads Bridge and Tunnel	HRCP	Hampton Roads, VA		x			
2021	Hwy 3 and Hwy 12	Saskatchewan Ministry of Transportation	Saskatchewan	x				
2021	Tunney Bridge	WSP	Toms River, NJ	x	x	x		
2020	Market Street Bridge	Gannet Fleming	Harrisburg PA	x				
2020	Seabreeze Bridge	KCA	Daytona Beach, FL	x				
2019	Arlington Memorial Bridge	Kiewit	Washington, DC	x	x	x		x
2019	Kamehaha Highway	Nagamine Okawa Engineers	Oahu, HI	x	x			
2019	Schuylkill River Bridge	Gannett Fleming	Berks County, PA	x				
2019	Brooklyn Queens Expressway	Triple Cantilever JV	NYC, NY				x	
2018	SW-SE Freeway	Parsons Transportation	Washington, DC	x				
2018	Stan Gober Memorial Bridge	FDOT	San Marco Island, FL	x				
2018	FDR Promenade	NYCDOT	New York, NY	x				
2018	Highway 2 over Missouri River	HDR	Nebraska City, NE	x				
2018	Wonderwood Bridge	FDOT	Jacksonville, VA					x
2017	Metalizing of I-94 Bridges	MN DOT	Minneapolis, MN		x			
2017	I-395 HOV Lanes	Parsons Transportation	Washington, DC	x				
2017	Blue Creek Bay Bridge	Collins Engineering	Coeur d'Alene, ID		x		x	
2017	SR 50 Bridge over Lake Bennett	FDOT	Ocoee, FL				x	
2017	Pinellas Bayway Bridges	FDOT	St. Petersburg, FL			x		
2017	Wonderwood Bridge PT Drying	Vector Corrosion Technologies	Jacksonville, FL					x
2017	Oregon DOT Bridges	Wiss, Janney, Elstner	Oregon	x				

BUILDINGS

2021	Honolulu Club	SSFM	Honolulu, HI	x			x	
2021	150 Bay Street	GFP Real Estate	Jersey City, NY	x			x	
2020	Oak Ridge National Laboratory	University of Tennesee	Oak Ridge, TN	x	x		x	
2019	Venetian Isles Condominiums	Turrell Hall Associates	Naples, FL	x	x	x		
2019	Franklin Field, University of Pennsylvania	CVM Professional Services	Philadelphia, PA	x		x	x	x
2018	Crystal Sands Condominiums	Crystal Sands Board of Directors	Siesta Key, FL	x	x	x		x

List of Representative Projects

MARINE STRUCTURES

Year	Project	Customer	Location	Corrosion Assessment	CP Design	CP QA/QC	Durability Consulting	Structural Monitoring
2021	Fall River Bulkhead	City of Fall River	Fall River, MA		x			
2021	Port of Tampa Berth 214	Moffatt & Nichol	Tampa, FL		x			
2021	Port of Tampa Cruise Term. 3	Moffatt & Nichol	Tampa, FL		x			
2020	Moffat & Nichol	Port of Tampa	Tampa, FL		x			
2019	Port of Corpus Christi	J.M. Davidson	Corpus Christi, TX		x	x		x
2019	Port Everglades	Callaway Marine	Fort Lauderdale, FL		x	x		
2019	Port of Port Arthur	Collins Engineering	Port Arthur, TX	x	x	x		
2019	Coal Pier XI	Dominion Terminal Associates	Hampton Roads, VA	x				
2018	Port Manatee	RS&H	Port Manatee, FL	x		x		
2017	Port Canaveral North Cargo Pier	CH2M Hill	Port Canaveral, FL	x	x			
2017	Port of Miami	Atkins	Miami, FL		x	x	x	

PARKING STRUCTURES

2022	Dane County Parking Garage	MP Squared	Madison, WI	x	x	x		
2021	9th Street Parking Garage	Hanson	Springfield, IL	x				
2021	MKE Parking Garage	WJE	Milwaukee, WI	x			x	
2020	McCormack Garage CP Evaluation	Simpson, Gumpertz & Heger	Boston, MA	x	x			
2019	St. Clair County Courthouse	Farnsworth Group	Belleville, IL	x	x	x		
2018	Sacred Heart Hospital Parking	Tim Haahs	Allentown, PA	x				
2018	Windsor Gardens Parking Garage	Windsor Gardens	Denver, CO	x	x			

SEWER AND WATER

2021	W 28th Flush Pit	Con Edison	New York, NY		x	x		
2021	Hells Gate Flush Pit	Con Edison	New York, NY	x				
2020	Hickam AFB Sewer Lift Stations	NOEI	Pearl Harbor, HI	x				
2020	Wikao Street Pipeline	SSFM International	Honolulu, HI		x			
2020	North School Street Pipeline	SSFM International	Honolulu, HI		x			

ENERGY, POWER AND DAMS

2022	Dunlap Dam	Zachry Construction	San Antonio, TX			x		
2021	Pine Grove Dam	Gannett Fleming	Oxford, PA	x			x	
2020	Sanford Power Plant	Miller Electric	Sanford, FL			x		x
2020	Transmission Line Foundations	Sargent & Lundy	Baltimore, MD		x			
2018	Capital Power Plant R-Tunnel	RMF Engineering	Washington, DC	x			x	
2014-2016	Chalk Point Cooling Tower cathodic protection	Vector Construction	Aquasco, MD		x	x		x

List of Representative Projects

Year	Project	Customer	Location	Corrosion Assessment	CP Design	CP QA/QC	Durability Consulting	Structural Monitoring
RAIL/TRANSIT								
2021	Long Island Railroad Bridge	Hardesty & Hanover	New York, NY	x	x		x	
2021	McKernan-Belgravia LRT	Graham Construction	Edmonton, AB	x	x			
2021	Union Pacific 485.7	TranSystems	Pine Bluff, AR		x			
2020	CSX Bridge Pile Study	HDR	Charleston, SC	x	x			
2020	UP Bridge 220-08	Transystems	Lake Charles, LA		x			
MILITARY								
2021	Naval Air station Jacksonville	RS&H	Jacksonville, FL	x			x	
2021	USCG Alameda Pier	Advanced Technologies	Alameda, CA			x		
2021	Kings Bay Dry Dock	Dawson	Kings Bay, GA	x	x	x		
2021	MacDill Air Force Base Water Tanks	Akima Facilities Management	Tampa, FL			x		
AIRPORTS								
2020	Kansas City Airport Hangar	Walter P. Moore	Kansas City, MO	x				
2019	JFK Airport	Twin Towers Enterprises	New York, NY			x		
PULP AND PAPER								
2021	Kimberly Clark Paper Plant	Vector Construction	Owensboro, KY		x	x		
2018	Marlboro Paper Plant	Domtar Paper	Bennettsville, SC	x			x	
AGRICULTURE/FOOD & BEVERAGE								
2021	Bayer Research Facilities	Bayer	St. Louis, IL	x				
2021	Cargil pH Pit	Cargill	Eddieville, IA	x				
2017	Monolithic Dome Rehabilitation	Cargill	Savage, MN	x				
MINING								
2018	Titan America Cement Silos	ABS Consulting	Medley, FL	x				
CHEMICALS								
2017	Concrete Settling Tank	The Chemours Company	Deepwater, NJ	x				

Staff Profile

VCS KEY TECHNICAL PERSONNEL

Matthew A. Miltenberger, P.E., NACE CP-4
Vice President

Matt has over 35 years of experience in the concrete industry as a materials researcher, Professional Engineer and certified NACE cathodic protection specialist (CP4). He has gained specific expertise related to corrosion of reinforcing steel, cathodic protection design, concrete condition assessments, repair and restoration, concrete durability and modeling, materials engineering and construction troubleshooting. Matt has a M.S. in Civil Engineering (Structures) and a B.S. in Civil Engineering from the University of Maryland, and a B.A. in Business Administration (Construction Management) from the University of Miami. He has authored over 35 peer reviewed papers, received the ACI Wason Medal in 2000, received ICRI project awards in 2016, 2018, and 2020, and is an active AMPP and ACI technical committee member.

Brian Pailes, Ph.D., P.E., NACE CP-4
Principal Engineer

Brian is a Professional Engineer and certified NACE cathodic protection specialist (CP4). Brian has extensive experience in the field of non-destructive evaluation (NDE), material testing, structural evaluation, cathodic protection, and corrosion. He earned a Ph.D. in Civil Engineering from Rutgers University, an M.S. in Civil Engineering from the University of Virginia and a B.S. in Civil Engineering from Northeastern University. Brian has also obtained a Graduate Certificate in Engineering Geophysics. Brian is the Chairman of the AMPP standards committed on Concrete Infrastructure, and is an active TRB Corrosion and ASNT Infrastructure committee member.

Natallia Shanahan, Ph.D., P.E., NACE CP-2
Senior Project Engineer

Natallia, a Professional Engineer, is a graduate of the University of South Florida, where she earned her Ph.D. in Civil Engineering with a concentration in materials, as well as an M.S. and B.S. in Civil Engineering. She has extensive experience in the assessment of concrete structures including the use of non-destructive techniques, such as ground penetrating radar and impact echo. In addition, Natallia is an expert in concrete materials, durability, and service life modeling.

Shayan Yazdani, M.S., P.E., NACE CP-2
Project Engineer

Shayan is a Professional Engineer who has obtained his B.S. and M.S. in Civil Engineering with a concentration in Materials Engineering & Science in Structures from the University of South Florida (USF). Shayan has extensive experience in data analysis and interpretation of reinforced concrete structures and very skilled in the design of cathodic protection systems. Shayan also has experience with repair and rehabilitation techniques of reinforced concrete structures, non-destructive testing (NDT), structural life prediction analysis and forensic engineering.

Staff Profile

VCS KEY TECHNICAL PERSONNEL

Sameer Telang,
M.S., E.I.T., NACE CP-2
Engineer II

Sameer has a Masters in Civil Engineering with a concentration in Structures from the University of South Florida (USF) as well as Masters in Physics and BE in Civil Engineering from BITS Pilani. Sameer has extensive experience in corrosion assessment, non-destructive techniques for structural evaluation, performing QA/QC of galvanic CP installation and troubleshooting active ICCP systems. He leads the development and implementation of remote monitoring technology, StructureView©, for cathodic protection systems and structural health monitoring.

Luke Longhofer,
E.I.T., NACE CP-2, SSPC PCI Level 2
Engineer II

Luke is an Engineer in Training who graduated cum laude with his B.S. in Chemical Engineering from the University of South Florida (USF). Luke has extensive experience with a vast array of coatings and has worked in the USF corrosion laboratory on the effectiveness of reinforcement coatings. Luke is also skilled in the use of coating inspection equipment and is a level 2 SSPC Protective Coating Inspector. In addition, Luke has a deep understanding of various non-destructive testing methods, which include impact echo, corrosion potential, and ground penetrating radar amongst others.

Pratik Murkute,
Ph.D., NACE CP-2
Engineer II

Pratik is a graduate of the Oregon State University where he earned his Ph.D. in Materials Science, he completed his M. Tech in Materials Engineering from the IIT Kanpur, India and a B. Tech in Metallurgical and Materials Engineering from VNIT Nagpur, India. He is an expert in the ferrous metallurgy and electrochemical, corrosion assessment of metals, with a focus on chloride induced corrosion of steel in concrete. Pratik also has experience in non-destructive techniques, such as ground penetrating radar, acoustic testing and impact echo with extensive knowledge in laboratory corrosion tests, steel metallurgy and materials engineering.

Madeline Lee,
E.I.T., NACE CP-2
Engineer II

Madeline is an Engineer in Training with several years' experience in the assessment and testing of corrosion, and cathodic protection. She holds a B.S. in Corrosion Engineering from the University of Akron and is knowledgeable in corrosion of marine structures and reinforcing steel in concrete. Madeline has vast experience with non-destructive testing and evaluation, structure condition assessments, and service lifecycle analysis.

Nicholas Brumbaugh
NACE CP-3 & CIP-1
Engineer I

Nicholas is an Engineer I with seven years experience in the assessment and testing of corrosion, and cathodic protection. Nicholas holds a B.S. in Corrosion Engineering from the University of Akron. Nicholas has his NACE CP-3 certification along with the NACE Coating Inspector Level 1. He has significant experience in the evaluation and troubleshooting of cathodic protection systems.

Staff Profile

VCS KEY TECHNICIAN

Aaron Veres,
NACE CP-2
Senior Engineering Technician

Aaron has over 20 years of experience in the concrete industry, specifically the restoration of concrete infrastructure. Prior to becoming a member of the VCS team, Aaron worked as a concrete restoration contractor, specifically on marine structures in Florida. This construction experience included installation of galvanic and impressed current CP systems along with other research and development projects. Aaron has conducted QA/QC testing of both galvanic and impressed current installations. Aaron has inspected and troubleshot active CP systems. Aaron is well versed in the use of various non-destructive testing methods, including impact echo and ground penetrating radar. Aaron is also trained regarding the inspection and assessment of post-tensioning systems.

NDT KEY TECHNICIANS

Keith Holster,
Operations Manager and Senior NDT Technician

Keith has obtained his B.S. in Hydrology from University of New Hampshire. Keith has over 22 years of experience with NDT Corp. conducting non-destructive testing measurements for projects evaluating the integrity and conditions of pipes, tunnel liners, piles and bridges; and geophysical measurements to detect sink holes and profile bed rock. Keith has directed field operations on multiple types of projects testing bridge deck, evaluating bridge foundations for scour, locating void post tensioning ducts and conducting condition assessments of pipelines.

Ben Armitage
R&D Manager and Senior NDT Technician

Ben has obtained his B.S. in Electronic Engineering Technology from New England Technical College. Ben has over 24 years of experiences with NDT Corp. and has used his electronic engineering skills to become the innovation manager that leads all the design and development of NDT Corp.'s testing equipment. Ben has supervised field operations for non-destructive testing measurements for projects evaluation the integrity and condition of slabs, bridge decks, pipes, piles, tunnel liners, and geophysical data to detect sink holes and profile top of bedrock.

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