

NDTitans



NDTitans is an international group of highly specialized, skilled and dedicated engineers, scientists and companies with many years of structural engineering and testing experience related to all aspects of concrete and reinforced concrete structures. The **NDTitans** are from Denmark, Finland, Poland, Greece, Ireland, India, Mexico, USA and Canada.

The group is driven by a culture of collaboration and entrepreneurial spirit, internally and in relation to clients.

NDTitans offer educational workshops relating concrete science to advanced methods for evaluation of concrete structures. Relevant ASTM standards, ACI guidelines and European standards are covered.

The group also offers testing services, professional advice, training and implementation of a wide range of test systems, worldwide.

Examples of services the **NDTitans** provides:

1. **Workshops.** Eighteen workshops have been conducted so far, worldwide. The workshops provide a unique blend of in-depth concrete science with the underlying principles, advantages, and limitations of various test systems. Included are demonstrations and opportunities for hands-on practice with selected systems. The original instructional team - **The Three Musketeers** -, Dr. Nicholas Carino, Dr. Andrzej Moczko and Mr. Claus Germann Petersen, has been augmented by teachers and instructors specialized in subjects such as corrosion of strands in cable ducts, ASR, and the application of drones for visual inspection.
2. **Training in and implementation of the test systems**
3. **On-line discussions, NDTITANS.COM**
4. **Professional testing services** for clients to ensure that testing with advanced systems is performed correctly, e.g., testing grout injection of cable ducts or joints between elements, voids below industrial floors, testing for safe and early loading of structures, and testing for evaluating the remaining service life or load carrying capacity.
5. **Supporting clients with interpretation and calculations.**
6. **Assist clients** in cases where the testing by others was executed improperly.
7. **Train technicians** until they are proficient with the fundamentals of testing. Specimens with known defects are available for this purpose at the Chicago and Copenhagen offices of Germann Instruments.



Scope of available testing

1. FRESH CONCRETE AND MIXTURE EVALUATION

- 1.1 Rheology
- 1.2 Chloride content of concrete and its components
- 1.3 Resistance to chloride penetration
- 1.4 ASR, reactivity of sand and aggregates
- 1.5 Alkali content (equiv. $\text{Na}_2\text{O}/\text{m}^3$) for evaluating the potential risk of ASR
- 1.6 Adiabatic heat development
- 1.7 Temperature simulation during construction
- 1.8 Air-void structure (spacing factor and specific surface)
- 1.9 Autogenous shrinkage of the mortar fraction

2. HARDENING STRUCTURES

- 2.1 Temperature recording
- 2.2 Maturity measurement
- 2.3 In-Place strength for safe and early loading
- 2.4 Cover layer quality
- 2.5 Curing effectiveness
- 2.6 Grout injection quality, e.g., in cable ducts and joints
- 2.7 Cracking evaluation
- 2.8 Crack depth

3. FINISHED STRUCTURES

- 3.1 Strength for QA/QC
- 3.2 Bond strength
- 3.3 Tightness of casting/construction joints
- 3.4 Water permeability
- 3.5 Chloride content
- 3.6 Resistance to chloride penetration of the cover layer
- 3.7 Reinforcement location
- 3.8 Petrography sample preparation

4. EXISTING STRUCTURES

- 4.1 Thickness of elements
- 4.2 Chloride ion profiling
- 4.3 Depth of carbonation
- 4.4 Corrosion activity
- 4.5 Corrosion mitigation
- 4.6 Remaining alkali content (equiv. $\text{Na}_2\text{O}/\text{m}^3$)
- 4.7 Integrity of cable duct injection and corrosion of strands
- 4.8 Strengthening of structures by CFRP
- 4.9 Voids, e.g., behind slabs, industrial floors and tunnel lining elements
- 4.10 Membrane failure
- 4.11 Strength for structural capacity
- 4.12 Cracking evaluation
- 4.13 Water tightness of joints



- 4.14 Air-Void structure
- 4.15 Crack movement
- 4.16 Bond strength
- 4.17 Internal defects
- 4.18 Delamination detection
- 4.19 Asphalt overlay de-bonding of bridge decks
- 4.20 Curling
- 4.21 ASR
- 4.22 Reinforcement location and size
- 4.23 Pile integrity
- 4.24 Removal of cores

AVAILABLE TEST SYSTEMS

- ICAR Rheometer
- AVA (Air Void Analyzer)
- Auto-Shrink
- RCT (Rapid Chloride Test)
- RAT (Rapid Alkali Test)
- MERLIN Bulk Electrical Conductivity Test
- PROOVE´it Rapid Chloride Permeability Test
- Heat Box (heat evolution)
- AP TempSim
- TMS (Temperatures, Maturity, Strength)
- Coma-Meter
- Pullout test, LOK-TEST, new structures
- Pullout test, CAPO-TEST, existing structures
- BOND-TEST
- MIRA Tomography (ultrasonic echo)
- DOCTer Impact-Echo
- s´MASH Impulse Response
- UPV (Ultrasonic Pulse Velocity)
- GWT (Germann´s Water Permeation Test)
- CoverMaster
- GPR (Ground Penetrating Radar)
- Rainbow Indicator for carbonation
- GalvaPulse (corrosion rate, potentials and electrical resistance of the cover layer)
- RapidAir (air-void structure)
- PIT (Pile Integrity Test)
- Corecase (precision core drilling)
- Drones for visual inspection.

Details on www.germann.org

NDTitans

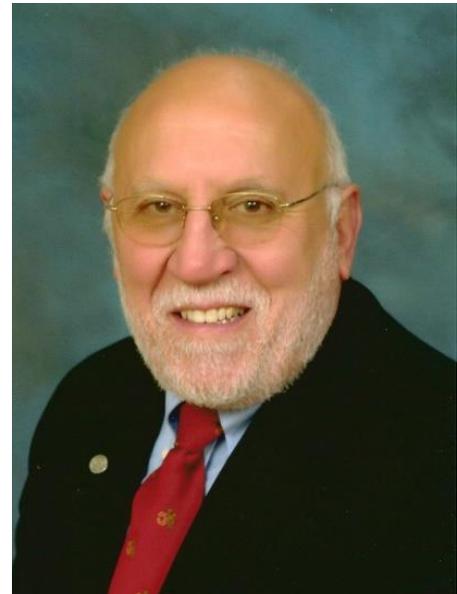


1. **Dr. Nicholas Carino**, ncarino@roadrunner.com
Concrete Technology Consultant, USA

Dr. Nicholas Carino is an internationally recognized researcher, author and educator on NDT and standard test methods. He retired from NIST after 25 years of service and is an independent consultant. He has served in many leadership positions on ACI and ASTM Committees.

Dr. Carino received many awards from ACI and ASTM for his contributions in research and standards development. He is an Honorary Member of ACI and a Fellow of ASTM.

Dr. Carino is responsible for the technical content of the highly-acclaimed NDT Workshops organized by Germann Instruments and international partners. These workshops are a unique blend of fundamental concrete science and the principles of advanced NDT methods.



2. **Dr. Andrzej MOCZKO** andrzej.moczko@pwr.edu.pl
**Professor at Faculty of Civil Engineering
Wrocław University of Science and Technology
Poland**

Dr. Andrzej Moczko is a Specialist in nondestructive testing and evaluation of reinforced concrete structures. He has more than 25 years of experience in the practical application of the DOCTer Impact-Echo system for flaws and thickness, and the s'MASH Impulse-Response system for rapid screening of flaws, LOK-Test and CAPO-Test for in-place compressive strength assessment; the Bond-Test for bond strength evaluation; the maturity method for estimation of strength development; GWT water permeability testing, Rapid Chloride Test; and corrosion evaluation.

Among other projects, Dr. Moczko was responsible for the Polish government's project regarding the structural assessment of Polish concrete bridges for modernization and continued safe use. The project involved extensive CAPO-TEST pullout testing together with core testing and rebound hammer testing on more than 50 bridges.

Dr. Moczko is a frequent teacher and instructor on modern NDT test systems, including the European testing standards. In addition, he authored several publications on modern NDT systems and their practical application. He is also a Senior Member of RILEM and a Member of the Polish National Standard Committee responsible for NDT techniques for concrete structures.





**3. Mr. Claus Germann Petersen, germann-eu@germann.org
In-Situ Test of Copenhagen Ltd
Denmark**

Claus Germann Petersen founded Germann Instruments in 1974, operating out of Copenhagen and Chicago, and In-Situ Test of Copenhagen in 1980. Mr. Petersen holds a B.Sc. diploma from the Danish Engineering Academy and is M.Sc. in economics from the Copenhagen Business School (CBS).

Mr. Petersen designed the LOK-TEST pullout instrument and invented the CAPO-TEST pullout system. He has been the central person in development and marketing of Germann Instruments test systems, including RCT (Rapid Chloride Testing), RCPT, RAT (Rapid Alkali Test), GalvaPulse for corrosion rate, DOCTer Impact-Echo, s'MASH Impulse-Response, MIRA tomography, GWT Water Permeability, AVA Air Void Analyzer and ICAR Rheometer.

He has 25 years of extensive, practical testing experience on-site with pullout, maturity, adhesion/tensile strength, chlorides and chloride profiling, electrical conductivity, carbonation, corrosion activity, impact-echo, impulse-response, MIRA tomography, water permeation and air-void analysis.

He is a member of ACI committee 228 on Nondestructive Testing of Concrete and has received a number of awards for his work in the NDT field, e.g., the Professor Ostenfeld Gold Medal from the Danish Society for Structural Science and Engineering. Mr. Petersen is a frequent



**4. Mr. Parampreet Singh, parampreet@aeandc.com
Avantech Engineering Consortium Pvt. Ltd. (AEC)
New Delhi, India**

Parampreet Singh has gained extensive experience in India on pullout testing for compressive strength, bond-strength evaluation, corrosion assessment, electrical conductivity testing including the chloride migration test, and testing for water permeation.

He is also specialized in homogeneity and integrity testing using ultrasound, impact-echo, impulse-response, MIRA tomography, and ground penetrating radar.

Mr. Singh is a frequent teacher and instructor in testing systems and has conducted several NDT workshops in India.

He is doing training on site with his experienced group of testing engineers, operating in India and the adjacent countries.





5. **Mr. Bernhardt Hertlein**, bhertlein@geiconsultants.com
GEI Consultants
USA

***Bernhardt H. Hertlein**, Senior Consultant at GEI Consultants, Inc., in Vernon Hills, Illinois, has specialized in geophysics, inspection and nondestructive testing methods for concrete structures and deep foundations, and construction-related vibration issues, for more than 35 years. He was half of the team that introduced Crosshole Sonic Logging (CSL), Parallel Seismic and Impulse-Response testing for deep foundations to the United States in the early 1980s, and he developed the Impulse-Response test (s'Mash) for plate-like concrete structures such as pavements, bridge decks, building façades and tunnel linings. His work experience has included projects throughout the US and Canada, and in Algeria, Guam, Hawaii, Hong Kong, Puerto Rico, Venezuela and several European countries.*



Bernie is the principal author of the book “Non-destructive Testing of Deep Foundations”, published by John Wiley & Sons in 2006. He is a past chairman of the Test and Evaluation Committee of the Deep Foundations Institute. He is also Secretary of ACI Committee 228 Nondestructive Testing of Concrete, past chairman of ACI Committee 336 Footings, Mats and Drilled Piers, and past chairman of ASTM Subcommittee C09.64 on Nondestructive and In-Place Testing.

He was elected a Fellow of the ACI in 2012, presented with the DFI Distinguished Service Award in 2015, and was elected into The Moles in May 2018.

6. **Mr. Guy Rapaport**, guy.rapaport@ramboll.fi
Ramboll Finland OY
Finland

***Guy Rapaport**, Civil Engineer, has 25 years of professional experience in the field of bridge engineering. He is acting at present as a Leading Consultant, NDT Business Manager and Project Manager in Ramboll Finland Oy.*

Mr. Rapaport is specialized in bridge repair planning, bridge- and concrete structures inspections and in state-of-the-art Nondestructive Testing (NDT) of concrete structures and bridges, including validation of NDT results.

Mr. Rapaport’s special expertise and extensive experience (about 100 test cases) is in special inspections and NDT evaluations of post-tensioned structures including tendon duct grout injection evaluation using MIRA ultrasound tomography and Impact-Echo, corrosion evaluation of prestressing steel and condition evaluation of bridge decks with Impulse-Response testing.



KEY QUALIFICATIONS: Certification of Qualifications of Bridge Chief Inspector, Bridge Chief Repair Planner and Bridge Inspector of the Finnish Transport Infrastructure Agency.



7. **Mr. Nikolaos Zoides, CEO, nzoidis@geotest.gr**
GEOTEST SA
Greece

Nikolaos Zoides, after finishing his M.Sc. studies at the Technical University of Crete, started his professional career in the construction industry as a QA/QC engineer on large infrastructure projects in Greece.

In 2003, he co-founded Geotest SA offering services in quality control testing of construction materials, nondestructive testing and inspection of concrete structures, especially industrial floors. He has been the company CEO ever since.

In 2011, Mr. Zoidis participated in the 1st International Workshop on NDT at Germann Instruments in Copenhagen. He organized two highly-successful international NDT workshops in Greece in 2016 and 2019.

Mr. Zoidis has more than 10 years of on-site testing experience with LOK-TEST and CAPO-TEST pullout tests, Impulse-Response, Impact-Echo, RCPT and RCT testing. He has also been involved with integrity and corrosion evaluation of bridge decks, and with using drones for visual inspection of large structures, e.g., wind turbines



8. **Mr. Sal Fasullo, Principal, C.E.T. sfasullo@davroc.com**
Davroc Testing Laboratories Inc.
Ontario, Canada

Sal Fasullo has over the years provided his expertise on many high profile and technically challenging projects such as the CN Tower, Royal Bank Plaza, Scotia Plaza, BCE Place, the Bay Adelaide Centre, Simcoe Place, the Humber River Bridge Project and many more projects across North America where high-performance concrete was used.

Furthermore, Mr. Fasullo participated in the introduction of new advanced concrete testing systems in Canada such as LOK-Test, maturity method, ultrasonic pulse velocity testing, rapid chloride permeability testing, Impact-Echo and Impulse-Response testing, chloride ion diffusion testing and many others.



Mr. Fasullo has, over the years, been in charge of and responsible for more than 50,000 LOK-TEST pullout tests for safe formwork removal and early loading of slabs of high-rise buildings.

Mr. Fasullo is a member in good standing of the Ontario Association of Certified Engineering Technicians and Technologists (OACETT), the American Concrete Institute (ACI), the Ready Mix Concrete Association of Ontario (RMCAO), and several CSA and ASTM Committees related to concrete technology.



9. **Dr. Thomas Callanan**, tom@infrastruct.ie
INFRASTRUCT Ltd
Ireland

Dr. Thomas Callanan is a Chartered Engineer with 22 years of experience in Civil Engineering. He previously worked as a Consulting Engineer and was the Director of a materials testing laboratory in Ireland.

Dr Callanan's primary focus is on Principal and Special Inspections of Bridges including Post-tensioning Special Inspections, on-site structural testing and investigations, and condition assessment of all types of civil engineering structures.

He has extensive experience using and interpreting information from a variety of test systems including the MIRA ultrasonic-echo tomographer, s'MASH Impulse-Response, DOCTer Impact-Echo, GWT Water Penetration, RCT Rapid Chloride Testing, UPV, GalvaPulse, Half-Cell Potential, and many other test systems.



10. **Mr. Oliver Aguirre**, oaguirre@neodexndt.com
NEODEX
USA/MEXICO

Oliver Aguirre, Civil Engineer, has 11 years of experience in the field of advanced nondestructive testing and is currently the technical manager and co-founder of NEODEX, with main operations in USA and Mexico.

Mr. Aguirre's career started in 2009 as a Sales Engineer for Germann Instruments. Inc., where he was trained to become an expert in advanced NDT systems. Oliver was deployed many times within the Americas to provide on-site training and technical assistance with data interpretation during structural evaluation projects, both with commercial and government institutions.



Since 2014, as the technical manager of NEODEX, he has conducted numerous condition assessment projects of existing commercial and residential structures.

Mr. Aguirre has vast experience with the implementation of the pullout test (LOK-Test and CAPO-Test) to determine the strength of concrete in structures, GPR and covermeter to quantify structural reinforcement, the use of stress-wave techniques such as Impact-Echo and MIRA (ultrasonic-echo) to examine localized internal cracking of concrete and Impulse-Response to determine overall structural integrity of massive plate structures. He has conducted structural assessments of bridges, light-rail structures, residential buildings, water treatment and commercial warehouse facilities.



11. Mr. Tasos Gotzamanis, gkatzaman@yahoo.gr

Geotest SA

Greece

Tasos Gotzamanis, MSc Civil Engineer, has 10 years of professional experience in the field of civil engineering and nondestructive testing of concrete structures.

Tasos is currently an engineer with Geotest SA and is involved in projects such as visual inspections and performing NDT tests, such as Impulse-Response, Impact-Echo, MIRA Tomographer and ground penetrating radar, in concrete structures.

In addition, he has extensive and practical experience with CAPO-TEST and BOND-TEST testing. Tasos is a specialist in using drones for visual inspection of structures (bridges, wind turbines) and he is an expert in the application of Artificial Intelligence in engineering and specially in recognizing defects in concrete structures, automatically.

KEY QUALIFICATIONS: Seismic engineering of structures, project management, inspection of structures with drones.



12. Mr. Malcolm, Lim, PE, President, m_lim@adeptgp.com

MLIM Consulting, Inc.

USA

Malcolm Lim, licensed Professional Engineer, is a nationally recognized expert in the evaluation of structures and has more than thirty years of on-site experience. He has evaluated conventionally reinforced, prestressed and post-tensioned concrete structures in over ten different countries and has performed over two thousand forensic structural assessments covering both sub and superstructures. Mr. Lim Master's Thesis emphasized the use of NDT to determine material properties of bridge decks and he is well versed in all NDT techniques including GPR, Impact-Echo, Impulse-Response, corrosion assessment and ultrasonic testing of concrete.

Mr. Lim has authored and co-authored 22 technical publications and has published a book on nuclear power plant assessment. Additionally, Mr. Lim holds one United States and one international industry-related patent. He has been the main speaker at seminars in the United Kingdom, United Arab Emirates, Saudi Arabia, Switzerland, and Singapore, and lectures a graduate-level class at a local university.





14. Mr. Todd Allen, todd.allen@radarviewllc.com
Radarview LLC / Universal Construction Testing, Ltd
USA

Todd Allen is President of Radarview/Universal Construction Testing (UCT), headquartered in Houston, TX with offices in Dallas, Austin/San Antonio, Chicago, and Miami.

His background includes 26 years as an NDT practitioner, NDT applications designer, expert witness, and manager. He is also an honorably discharged veteran of the US Navy. Mr. Allen is a published author in professional trade journals/magazines and has presented numerous times for engineering and trade associations. He currently serves as a voting member of ACI Committee 228 (NDT) and ICRI Committee 210 (Evaluation).

Radarview/Universal Construction Testing is a group of engineers, geologists, and NDT specialists in determining concrete/steel/wood as-built construction and condition parameters as well as an array of subsurface examination and testing services, such as: field and laboratory forensic examination and testing services including concrete, masonry, steel, wood, and soils. The company has extensive experience in performing field NDT, specimen collection, and laboratory analysis. Radarview LLC was established in 2002 and acquired UCT (est.1983) in 2013.



15. Mr. Hugo Orozco, hugo@germann.org
Germann Instruments A/S
Denmark

Hugo Orozco is a Civil Engineer and MBA with 16 years of experience in the assessment of reinforced concrete structures. He is specialized in various NDT techniques, the science of concrete deterioration, and the implementation of strategies for damage prevention, protection, repair and structural strengthening, especially with fiber reinforced polymers (FRP composites).

He worked for Sika Mexico as a Product and Market Manager in charge of the marketing, development and technical support for the portfolio of solutions for concrete repair and protection, grouting, structural bonding, chemical anchoring and structural strengthening with FRP.

Hugo has participated in many projects providing advice, on-site training, supervision and technical assistance, dealing with existing and new structures such as buildings, highways, bridges, piers, tunnels, foundations, silos, power plants, industrial and commercial facilities, for private companies and governmental agencies.





**16. Mr. Ricardo de León, ricardo@germann.org
Germann Instruments A/S
Denmark**

Ricardo de León, Civil Engineer and MSc, has over 10 years of experience in research, design and testing. He was Chief of a geotechnical testing laboratory that provided services to Mexico's Department of Transportation, and is skilled in pavement design, SUPERPAVE asphalt mixture design, and Q/C testing of materials for road construction.

Ricardo was a research assistant at the Universidad Autónoma de Nuevo León and collaborated in several research programs related to concrete rheology, the use of alternative cementitious materials and industrial waste in concrete, chloride migration testing, and evaluation of steel corrosion.

He worked for CEMEX in Guadalajara, Mexico, as a QC analyst where he was involved in specifying and designing concrete products, ensuring the quality of materials, adjusting mixture designs, and responding to customer inquiries. His experience in dealing with customers, who sought assurance that finished products were in compliance with specifications, turned his interests to the field of nondestructive and in-place testing. Ricardo believes all concrete professionals should be knowledgeable in current NDT technologies.

