



Engineers Joint Committee of Long Island

Anthony Cacioppo, P.E., Chair
Paul Lanzillotta, P.E., Vice-Chair

ENGINEERS WEEK SEMINAR SERIES

Thursday, February 15, 2024

(Snow Date: Thursday, March 7, 2024)

Place: *Holiday Inn Plainview - 215 Sunnyside Boulevard, Plainview, NY 11803*
516-349-7400 (Front Desk)

Program:	8:00 am – 9:00 am	Registration & Continental Breakfast
	9:00 am – 10:00 am	Morning Seminars
	10:00 am – 10:15 am	Break
	10:15 am – 12:15 pm	Morning Seminars Cont'd.
	12:15 pm – 1:15 pm	Lunch
	1:15 pm – 3:15 pm	Afternoon Seminars
	3:15pm – 3:30 pm	Break
	3:30 pm – 4:30 pm	Afternoon Seminars Cont'd.

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Seminars & Descriptions

“Long Island Railroad Expansion Project” (1 PDH)
Presented by: John Mastera, PE, ARUP

9:00 am – 10:00 am

The LIRR Expansion Project is a \$2.5B Design-Build that was completed in 4.5 years by constructing over 9 miles of a new track, elimination of 8 at-grade street crossings, reconstruction of five passenger stations, construction of 2 parking garages, installation of over ten miles of retaining and sound attenuation walls, and all new railroad systems & infrastructure. In this presentation, you will learn details of how complex engineering challenges and solutions resulted in the success of this project. Such challenges included how to replace a bridge, build a roadway beneath the tracks, replace a station, install new interlocks, and replace an entire railroad infrastructure, all while maintaining railroad operations and limiting impacts to users.

“The I95 Emergency Rebuild and Beyond” (2 PDH)

10:15 am – 12:15 pm

Presented by: Theresa Andrejack Loux, Ph. D., P.E. & Archie FilShill, Ph.D, Aero Aggregates NA

On the morning of June 11th, 2023, a tanker truck carrying approximately 8,500 gallons of gasoline crashed and caught fire on the Cottman Avenue exit ramp under Interstate 95 in northeast Philadelphia. The fire collapsed the bridge carrying the northbound lanes of the interstate and severely damaged the southbound bridge. Ultra-lightweight Foamed Glass Aggregate (UL-FGA) is a lightweight fill alternative that was a critical component of the I-95 rebuild and supported the accelerated schedule and provided a path to reopening the interstate only 12 days post-collapse.

This presentation will review the engineering properties of UL-FGA and the common building and infrastructure applications where a UL-FGA lightweight fill solution is warranted. The engineering challenges from projects where UL-FGA was used will be shared through several detailed case histories, including the I-95 Emergency Rebuild.

“Virtual Bridge Inspection Training - AR” (2 PDH)

1:15 pm – 3:15 pm

Presented by: Sunny Kim & Nicolas Sosa. Greenman-Pedersen, Inc.

The Virtual Bridge Inspection simulation software, which uses Virtual Reality (VR,) is a collaborative effort between Greeman-Pedersen, Inc., the National Highway Institute (NHI) and the Federal Highway Administration to create a training program that complements NHI's. bridge inspection training courses. The program is curated by certified course instructors and provides bridge inspectors with specialized, hyper-realistic training in a safe, interactive environment closely resembling real-world inspections.

“Buildings & Homes in Flood Hazard Area s” (1 PDH)

3:30 pm – 4:30 pm

Presented by: Brett Belair, Simpson-Tie

This course explores flood requirements, concepts and details of flood resistant construction, the use of anchors, fasteners, and connectors in flood resistant buildings, and the relevant terminology, codes and standards that should be used..

“The Evolution of Refrigerants for our Modern Climate” (1 PDH)

9:00 am – 10:00 am

Presented by: Richard Smith

With the onslaught of Regulations against the use of Petroleum products to provide Heat & DHW in Commercial & Residential buildings, it has become necessary to move to Electrification & Refrigerant based heat & hot water generation. While this is going on the ever increasing pressure to move to reduce GWP of CFC HCFC and HFC type refrigerants is impacting & creating a need to select alternates to balance efficiency, compliance & flammability of those refrigerants. We also must review the application of natural refrigerants, like carbon dioxide, ammonia, hydrocarbons and water.

This presentation will provide an update on new lower GWP alternatives introduced into the marketplace and it will highlight some important considerations, particularly flammability, that engineers, designers and building owners should keep in mind regarding next-generation refrigerants.

“Six Sigma Basics” (2 PDH)

10:15 am – 12:15 pm

Presented by: Scott Damiani, Wolters Kluwer

In this seminar, attendees will learn about the components and tools which are used in the Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) methodology. Detailed examples of several tools will be presented for the various phases of a sample Six Sigma initiative. The session will cover how Six Sigma integrates with other methodologies such as Lean and Agile. The session will also address how company management can create an environment for Six Sigma success. Some case studies will be presented associated with more than just manufacturing; such in service companies, financial institutions, healthcare, and construction industry. Attendees will also learn about the various levels of Six Sigma training and certification, which could help with career advancement and goals.

“Finite Volume Methods in CFD” (2 PDH)

1:15 pm – 3:15 pm

Presented by: Nick DiZinno, Ph. D., PE, New York University

The equations that govern fluid flow and heat transfer are extremely complex. In many instances, they are impossible to solve in an analytical (closed-form) manner. In these cases, engineers are forced to rely on Computational Fluid Dynamics (CFD) simulation to generate a solution. As the foundation of many commercial CFD software packages, the Finite Volume Method (FVM) is a general solution framework that is applicable to a broad range of problems. This seminar will give a conceptual introduction to FVM to solve engineering problems. We will examine what popular CFD software packages do, and select results from a variety of application will be presented. At the conclusion of the seminar attendees will understand the strengths and limitations of FVM and how to utilize this knowledge when using their favorite CFD software package.

“Coherent Turbulent Flow in Structures (1 PDH)

3:30pm-4:30pm

Presented by: Wayne Oaks, Ph. D., PE

Turbulence flow is defined by the chaotic changes in the fluid flow’s pressure and velocity. It occurs in three dimensions and is random in nature. Yet, there is order in this madness and I’m going to show this order using Coherent Turbulent Structures. Shear layers, vortices, and horseshoes are just some of these structures.

Three steps are used in calculating these structures with a general description of computing the fluid field (Computation Fluid Dynamics), finding trajectories of particles inserted into the flow (Lagrangian Particle Tracking), and how to generate the Coherent Turbulent Structures (finite-time Lyapunov exponents).

Finally, two examples from the work will show the application of these techniques. The first is a COVID19 related study of the efficacy of face masks in reducing the spread of the virus. The second will show the path of a point source release of pollutants in southern Manhattan.

“Artificial Intelligence, Comparative Study of Large Language Models” (1 PDH) 9:00 am – 10:00 am

Presented by: Gus Sapias, President, Xogito

In today’s rapidly evolving digital world, Large Language Models (LLMs) have become instrumental in reshaping diverse sectors, ranging from customer service to content creation, and from language translation to code generation. Their pervasive influence calls for a comprehensive understanding of how they work, what distinguishes one type from another, and where the technology is headed. This presentation will embark on a deep dive into both open-source and closed-source LLMs, aiming to provide engineers with a holistic understanding of these powerful tools.

“Intrinsic Safety Electrical Protection for Hazardous Areas” (2 PDH)

10:15 am – 12:15 pm

Presented by: John Piccinic, Regional Sales Mgr., Eaton Corp.

Intrinsic Safety (IS) offers unique advantages compared to other protection methods for the safe use of low-powered electronic instrumentation in potentially explosive hazardous areas. This seminar will highlight those advantages and demonstrate how the “Zener” barrier’s simple circuit design achieves IS protection using an electrical engineering perspective in layman’s terms. The presentation will include a hard-wired demonstration and circuit simulation software to visualize how IS works. In addition, videos of explosions will be shown along with a live demonstration of electric (arc) spark ignition. IS product specifications and standards will also be discussed to facilitate the engineer’s IS product selection knowledge.

“Machine Learning Driven Mechanism Design” (2 PDH)

1:15 pm – 3:15 pm

Presented by: Anurag Purwar, Ph. D., SUNY-Stony Brook

This seminar will present a new computational and physical paradigm for robot mechanism design, which brings together machine learning and kinematics for motion design problems. Attendees will learn about a new computational framework for simultaneous type and dimensional synthesis and explore the interaction between geometry and motion in a web-based design software. Moreover, attendees will also be able to physically prototype robot mechanisms via a “walking” robot.

“Energy Conversion Efficiencies” (1 PDH)

3:30 pm – 4:30 pm

Presented by: Yongjian Gu, Ph. D., P.E., US Merchant Marine Academy

Efficiency is one of the most popular subjects to describe how well an energy conversion processes. Energy exists in numerous forms such as thermal, mechanical and electrical. Energy Conversion is typically fulfilled by a process through equipment or a machine; thus the conversion efficiency is frequently referred as the equipment or machine efficiency, for example pump efficiency, motor efficiency, boiler efficiency, heat pump efficiency and turbine efficiency. This presentation presents and illustrates these various efficiencies. In general, measurement of the energy conversion efficiency is based on the first law of thermodynamics in one identical energy source level, which is called the “first law efficiency.”

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(Snow Date: Wednesday, March 6, 2024)

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	Room/Track A	Room/Track B	Room/Track C
9:00 - 10:00	<i>Long Island Railroad Expansion Project 1 PDH</i>	<i>The Evolution of Refrigerants for our Modern Climate 1 PDH</i>	<i>Artificial Intelligence, Study of Large Language Models 1 PDH</i>
10:00 – 10:15	BREAK		
10:15 - 12:15	<i>The I95 Emergency Rebuild and Beyond 2 PDHs</i>	<i>Six Sigma Basics 2 PDHs</i>	<i>Intrinsic Safety Electrical Protection for Hazardous Areas 2 PDHs</i>
12:15 - 1:15	LUNCH		
1:15 - 3:15	<i>Virtual Bridge Inspection Training (Augmented Reality) 2 PDHs</i>	<i>Finite Volume Methods in CFD 2 PDHs</i>	<i>Machine Learning Driven Mechanism Design 2 PDHs</i>
3:15 – 3:30	BREAK		
3:30 - 4:30	<i>Buildings and Homes in Flood Hazard Areas 1 PDH</i>	<i>Coherent Turbulent Flow in Structures 1 PDH</i>	<i>Energy Conversion Efficiencies 1 PDH</i>

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