CFSEI

2024 ANNUAL EXPO

LOEWS VENTANA CANYON RESORT
TUCSON, ARIZONA

May 20-22, 2024

THANK YOU TO OUR SPONSORS

CFSEI
COLD-FORMED STEEL
ENGINEERS INSTITUTE

Welcome to the 2024 CFSEI Expo, in Tucson, Arizona! I hope you packed your golf clubs, or at least your sunscreen, hat, and enthusiasm for thin steel.

As we do every year, we gather to celebrate excellence in the cold-formed steel community, forge new relationships and professional networks, and advance our knowledge. We create the esprit de corps of our industry. We reaffirm our commitment to technical advancement, safety and reliability, and economy and efficiency – the hallmarks of great engineering.

Our talks this year will take you from the cold-formed steel classroom to diaphragm design, to wildfire- and earthquake-resilient structures. We even have talks on progressive collapse and ground penetrating radar. What I hope you take away from our series of topics is that there's a lot of energy and potential in the cold-formed steel industry. I challenge you to attend a talk where you don't even fully understand the title. Ask a question to a speaker you've always wanted to meet. Refresh your knowledge on something you think you're an expert in. I love the saying, "the more you know, the more you realize you don't know" and the CFSEI Expo is the best place to see the incredible breadth and depth of cold-formed steel engineering.

On a personal note, I would like to thank the CFSEI Executive Committee and Staff for their tremendous work this past year. It was a year of immense growth for myself, both literally and figuratively, as I gave birth to my daughter at the beginning of my term as CFSEI President. During the newborn weeks, as my world temporarily transformed from studs and buckling to (no) sleep and bottles, the Executive Committee and formidable CFSEI staff took on my responsibilities. When I started returning to meetings, with my baby not-so-quietly observing, they welcomed her and regaled me with their own stories of parenthood in the early months. The care and accommodation I experienced from my colleagues is something I'm both grateful for and proud of. I'm proud of our industry for creating a culture of inclusion.

In the spirit of inclusion, I hope you introduce yourself to someone new every day you're at the Expo. We have a wonderful program which brings young cold-formed steel engineers to the Expo, free of charge. Say hello, and invite them to share a meal or a beer with you. Introduce them to your friend who works near them. Ask them who they'd love to meet, or what goal they'd like to accomplish at this year's Expo. Help them achieve their goal.

A wonderful thing about our CFSEI Expo is that we shine a spotlight on excellence through our award winners (notably our John P. Matsen Award for Distinguished Service), our speakers, and our volunteers. What you see and experience during this conference is a result of decades of hard work and service for the cold-formed steel industry, and shining that spotlight sets the standard by which we define ourselves.

We give special thanks to our returning and new sponsors who contribute so much to making the Expo successful:

ClarkDietrich Building Systems	Advant Steel LLC	MiTek
SFIA	Argos Systems	Nucor Vulcraft/Verco
SSMA	ASC Steel Deck	Scottsdale Construction Systems
USG	CEMCO	Steel Deck Institute
Simpson Strong-Tie	DeWalt	Super Stud Building Products, Inc.
TrusSteel	FrameCAD	aerosmith
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And one final thank you to the presenters, staff, volunteers, and YOU, CFSEI Expo attendees, for making this event and our industry a great one.

Sincerely,

Kara Peterman, Ph.D.
2023-2024 CFSEI Chair

TOP

MONDAY, MAY 20, 2024

2:00 p.m. – 4:00 p.m.
West Parking Lot

CFS – Tool Time Hands-On Demo

5:00 p.m. – 6:00 p.m.
Ventana Heights Terrace

Welcome Reception (Margaritas, Chips, Guac, and Salsa)
Sponsored by ClarkDietrich

TOP

TUESDAY, MAY 21, 2024

7:00 a.m. – 4:00 p.m.	Registration in Grand Ballroom Foyer
7:00 a.m. – 8:30 a.m.	Breakfast in Cascade Terrace
9:00 a.m. – 10:00 a.m. Grand Ballroom (Salons B & C)	**Specialty Engineering from the Contractor's Perspective** Don Allen, P.E., S.E., LEED AP, Association of the Wall and Ceiling Industry (AWCI)
10:00 a.m. – 10:15 a.m.	Break with Sponsors in Grand Ballroom (Salons B & C)
Salon A 10:15 a.m. – 11:15 a.m.	**Fasteners / Anchors in Seismic Design** Robert Madsen, P.E., Devco Engineering, Inc.
Catalina Ballroom 10:15 a.m. – 11:15 a.m.	**Expectations from Prefab CFS Manufacturer/Installer on Structural Drawings** Venkata Charan, P.E., Digital Building Components LLC
11:30 a.m. – 12:45 p.m.	**Lunch: Annual Meeting and Awards in Grand Ballroom (Salons B & C)**
Catalina Ballroom 1:00 p.m. – 2:00 p.m.	**Cold-Formed Steel Classroom: Intro to AISI S100** Reinhold Schuster, Ph.D., P.ENG., University of Waterloo
Salon A 1:00 p.m. – 2:00 p.m.	**How Curtain Wall & Storefront Design Interfaces with Cold-Formed Steel** Jamie John, P.E., Excel Engineering, Inc.

2:00 p.m. – 2:15 p.m.	Break with Sponsors in Grand Ballroom (Salons B & C)
2:15 p.m. – 3:15 p.m. Salon A	**Engineering Progressive Collapse in Cold-Formed Steel Buildings** Nabil Rahman, Ph.D., P.E., FDR Engineers, PLLC
2:15 p.m. – 3:15 p.m. Catalina Ballroom	**ASCE 7-22 And The Effect on Cold-Formed Steel Trusses** Jacob Thompson, P.E., S.E., TrusSteel
3:15 p.m. – 3:30 p.m.	Break with Sponsors in Grand Ballroom (Salons B & C)
3:30 p.m. – 4:30 p.m. Grand Ballroom (Salons B & C)	**Keynote** **Development of Standards for Australian Steel Framed Houses Subject to Wildfire Attack** Ken Watson, National Association of Steel-Framed Housing Institute
5:30 p.m. – 9:00 p.m.	Dinner & Social Event **Pima Air & Space Museum**

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WEDNESDAY, MAY 22, 2024

7:00 a.m. – 3:15 p.m.	Registration in Grand Ballroom Foyer
7:00 a.m. – 8:30 a.m.	Breakfast in Cascade Terrace
9:00 a.m. – 10:00 a.m. Grand Ballroom (Salons B & C)	**Applied Ethics for Engineers** Brett Stewart, AXA XL
10:00 a.m. – 10:15 a.m.	Break with Sponsors in Grand Ballroom (Salons B & C)
Salon A 10:15 a.m. – 11:15 a.m.	**CFS-NHERI Project Update** Tara C. Hutchinson, Ph.D., P.E., University of California, San Diego
Catalina Ballroom	**Deep Learning-Based Damage Detection in Concealed Cold-Formed Steel Structures using Ground Penetrating Radar** Muhammad Taseer Ali, University of Houston
11:30 a.m. – 12:45 p.m.	**Lunch: Award Winner Presentations in Grand Ballroom (Salons B & C)**
Salon A 1:00 p.m. – 2:00 p.m.	**Cold-Formed Steel Diaphragm Design** Zane Clark, P.E., S.E., McClure Ian Micklethwaite, P.E., ASC Profiles
Catalina Ballroom	**Residential Design Beyond AISI S230** W. Donald Wheeler, Wheeler Steel Framing Supply
2:00 p.m. – 2:15 p.m.	Break with Sponsors in Grand Ballroom (Salons B & C)
2:15 p.m. – 3:15 p.m. Grand Ballroom (Salons B & C)	**CFS – Ask An Expert** Don Allen, P.E., S.E., LEED AP, Association of the Wall and Ceiling Industry (AWCI) Patrick M. Hainault, P.E., R.A. Smith, Inc.
3:15 p.m.	Expo Closes

MONDAY, MAY 20, 2024: 2:00 PM – 4:00 PM: WEST PARKING LOT

CFS – TOOL TIME HANDS-ON DEMO

CONTINUING EDUCATION - 2 PROFESSIONAL DEVELOPMENT HOUR

This CFS interactive workshop will give sponsors exclusive design access a chance to showcase products and network with expo attendees.

West Parking Lot
Loews Ventana Canyon Resort
7000 N Resort Drive
Tucson, Arizona 85750

MONDAY, MAY 20, 2024: 5:00 PM – 6:00 PM: VENTANA HEIGHTS TERRACE

WELCOME RECEPTION

Margaritas, Chips, Guac and Salsa.

Network with other expo participants at Ventana Heights Terrace outdoor serenity.

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TUESDAY, MAY 21, 2024: 9:00 AM – 10:00 AM: GRAND BALLROOM (SALONS B & C)

SPECIALTY ENGINEERING FROM THE CONTRACTOR'S PERSPECTIVE

CONTINUING EDUCATION - 1 PDH/ 1 LU

Your customers – the contractors – are becoming more sophisticated as construction projects become more complex. Contractors now must deal with advanced technology, increased security and safety, increased oversight and scrutiny and new regulations at the state and local levels that are way beyond anything in the building code. They must comply with green building programs and regulations, more complex electrical and mechanical systems and do this while dealing with labor shortages, supply chain issues and global material price fluctuations. The old paradigm was that engineered shop drawings were a necessary evil: something that they had to include in their price, but not necessarily something they wanted to have done.

Today, more sophisticated contractors realize that having an engineering partner looking out for their best interest can be a sound investment, especially when that engineer understands the new reality of the modern job site.

In this presentation, industry veteran Don Allen will give examples of contractor/engineer interactions and share what went right and what could have been done differently. Through these stories, Allen will help you empathize with your contractor customers and better understand what they must go through to win and successfully complete their projects.

Don Allen, P.E., S.E., LEED AP
Association of the Wall and Ceiling Industry (AWCI)

Don Allen has worked in cold-formed steel (CFS) specialty engineering since 1990. He has been involved in projects in Africa, Europe and North America. He has presented on CFS in Colombia, China, Egypt, and now Arizona. Having worked for hundreds of specialty contractors over the years, and now representing a contractor-focused association, Allen understands the issues CFS specialty contractors face every day. As Director of Technical Services for the Association of the Wall and Ceiling Industry (AWCI), Allen works with contractors daily, helping them to be profitable and safe in an increasingly complex and competitive construction marketplace.

TOP

TUESDAY, MAY 21, 2024: 10:15 AM – 11:15 AM: SALON A

FASTENERS/ANCHORS IN SEISMIC DESIGN

CONTINUING EDUCATION - 1 PDH / 1 LU | HSW

Approved Continuing Education

Connection design is a critical part of every cold-formed steel (CFS) framing project. Connections designed to resist seismic forces can present unique challenges in terms of force magnitude, direction and special code requirements related to ductility. In this presentation, Rob Madsen, P.E., will discuss special considerations for the seismic design of connections for building components as well as connections in lateral force resisting systems.

Rob Madsen, P.E.
Devco Engineering, Inc.

Rob Madsen, P.E., is a Principal at Devco Engineering, Inc., in Enterprise, Oregon, and has been engineering cold-formed steel (CFS) components and structures since 1991. Madsen has served as the chair of the CFSEI Technical Review Committee since 2007 and was the chair of the AISI Committee on Framing Standards, Lateral Subcommittee. He has also been involved in the development of software and product technical data used throughout the CFS framing industry.

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TUESDAY, MAY 21, 2024: 10:15 AM – 11:15 AM: CATALINA BALLROOM

EXPECTATIONS FROM PREFAB CFS MANUFACTURER/INSTALLER ON STRUCTURAL DRAWINGS

CONTINUING EDUCATION - 1 PDH / 1 LU|HSW

STEEL TECH
PANELIZED FRAMING

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In addition to expectations of quick turnaround and quick response from structural engineers, the manufacturer/installer also expects engineers to give creative solutions that align with the contractor's preferences.

AIA Approved Continuing Education

Venkata Charan, P.E., will discuss the expectations or preferences that a cold-formed steel (CFS) manufacturer/installer expects on structural drawings. This presentation will include preferences such as screw vs weld connections, anchor type/spacing, drift vs stacked system, direct applied vs drift track system, bracing preferences, minimum access requirements at clip connections, minimum access for anchors, minimum access for hold down, stud consolidation etc.

Venkata Charan, P.E.
Digital Building Components LLC

Venkata Charan, P.E., is a structural engineer with a passion for innovation and excellence in construction. He is a key member of the structural engineering team at Digital Building Components. Charan specializes in the intricate design, fabrication, and construction of cold-formed steel (CFS) walls.

Before joining Digital Building Components, Charan worked as a Project Engineer in a construction firm building lattice steel towers and as a structural engineer in a consulting firm working on various projects in California. Charan's comprehensive background spanning design, fabrication and construction brings a unique and innovative perspective to project execution. During his free time, he works with machine-learning models using Python libraries. Charan earned his B.S. degree in Civil Engineering from Pondicherry University and M.S. degree in Civil Engineering from the University of Houston. He is a registered Professional Engineer in Arizona.

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TUESDAY, MAY 21, 2024: 11:30 AM – 12:45 PM: GRAND BALLROOM (SALONS B&C)

LUNCHEON

CFSEI ANNUAL MEETING AND AWARDS

INSTALLATION OF CFSEI EXECUTIVE COMMITTEE

TOP

TUESDAY, MAY 21, 2024: 1:00 PM – 2:00 PM: CATALINA BALLROOM

COLD-FORMED STEEL CLASSROOM: INTRO TO AISI S100

CONTINUING EDUCATION - 1 PDH / 1 LU | HSW

Design involves achieving a desired member or connection behavior. AISI S100, North American Specification for the Design of Cold-Formed Steel Structural Members provides a means of estimating such behavior. The CFSEI website currently offers a six-lecture series (https://cfseiondemand.com/aisi-standard-courses/) focused on providing the engineering community with an understanding of the AISI S100 specification provisions. However, this current lecture series is based on the 2012 edition of the specification. The authors have recently completed an update of the lecture series PowerPoint slides to reflect the current code adopted AISI S100-16 w/S2.

Because the behavior and design for cold-formed steel (CFS) structures are not taught typically in engineering schools, structural engineers are often required to self-teach these concepts.

This lecture series is intended to provide a basic understanding of the behavior and design principles for CFS members and connections. These principles will be applicable to many aspects of CFS design, including tension members, columns, beams and bolted, welded and screw connections. The lecture material will be applicable for the spectrum of CFS design to include wall studs, joists, purlins, girts, trusses, panels, and deck. The use of the AISI S100 will be demonstrated through numerous example problems.

Reinhold Schuster, Ph.D., P. Eng., will introduce this new on-demand CFSEI educational program.

Reinhold Schuster, Ph.D., P. Eng.
Distinguished Professor Emeritus of Civil Engineering
University of Waterloo

Dr. Schuster is a well-known lecturer on the topic of CFS design. Since November 1996, Dr. Schuster and Dr. Roger LaBoube have been co-developers and co-presenters of this lecture series.

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TUESDAY, MAY 21, 2024: 1:00 PM – 2:00 PM: SALON A

HOW CURTAIN WALL & STOREFRONT DESIGN INTERFACES WITH CFS STEEL

CONTINUING EDUCATION - 1 PDH / 1 LU | HSW

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As two of the primary building "skins," cold-formed steel (CFS) framing often supports loads imposed from the curtain wall and/or storefront systems with little coordination between the two specialties. Different glazing systems attach to the surrounding framing in various ways. The connection type and locations control the manner in which the loads from the glazing system are applied to the surrounding CFS structure. Multiple factors are considered by the glazing engineers and suppliers when determining the best attachment solution and locations and, without understanding those considerations, CFS engineers may account for the loads appropriately.

Having experience in both CFS and glazing engineering, Jamie John will cover some basic concepts of glazing system design, so CFS engineers can use common practice assumptions to ensure loads are being adequately supported and accounted for. A greater understanding of common applications will help CFS engineers make (more) educated design decisions and encourage greater coordination between the two systems on complex projects. As building designs continue to push the limits of conventional engineering, it is important for specialty engineers to work toward understanding the interactions between different systems to meet all necessary minimum design assumptions and provide a quality design.

Jamie John, P.E.
Excel Engineering, Inc.

Jamie John is a Registered Professional Engineer at Excel Engineering. She is responsible for the management of a large variety of cold-formed steel (CFS) framing projects. As part of the CFS group for over 10 years, John transitioned to Excel Engineering's glass group in early 2023 and has spent 12 months working in the industry, gaining valuable insight on the interface and coordination required between CFS framing, building structures, building finishes, and glazing systems. Her further understanding of glazing system attachments and tolerances has made her a resource to the team, providing an in-house point of reference for system attachment locations and requirements. John's diverse project experience of structural engineering practice allows her to provide detailed and cost-effective design solutions.

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TUESDAY, MAY 21, 2024: 2:15 PM – 3:15 PM: SALON A

ENGINEERING PROGRESSIVE COLLAPSE IN COLD-FORMED STEEL BUILDINGS

CONTINUING EDUCATION - 1 PDH / 1 LU | HWS

Progressive collapse guidelines for DoD buildings were first introduced in 2001 to provide design requirements to reduce the potential of disproportionate collapse for new and existing DoD facilities in an extreme blast event. The guidelines are published in the Unified Facilities Criteria UFC 4-023-03, Design of Buildings to Resist Progressive Collapse, and are applicable to buildings three (3) stories and taller. Since cold-formed steel (CFS) framing is a potential construction material in mid-rise load-bearing wall structures for DoD facilities, it is essential for CFS engineers to learn practical methods to analyze and design CFS framing to resist progressive collapse.

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This presentation will introduce the main concepts of structural design to mitigate the effects of progressive collapse in buildings, then will discuss the differences between the direct and the indirect methods of design. Focusing on CFS load-bearing wall buildings, the presentation will discuss how to qualify the structural components of the building (walls, floors and roof) for the progressive collapse analysis. A worked design example for a multi-story building will be presented and discussed with a focus on how to deal with sizing framing members and connection details.

Nabil Rahman, Ph.D., P.E.
FDR Engineers, PLLC

Nabil Rahman, Ph.D.,P.E., is a Principal at FDR Engineers in Raleigh, NC. Dr. Rahman is a past chairman of the Cold-Formed Steel Engineers Institute (CFSEI) and was the 1st recipient of John P. Masten Distinguished Service Award from CFSEI. He is also a past chairman of ASCE-SEI Committee on Cold-Formed Steel and a member of the CFS Committee on Specification and Committee on Framing.

Dr. Rahman has a vast experience in design and fabrication of CFS framing, as well as product development and software development. Dr. Rahman has been a blast consultant on several CFS projects, including load bearing barracks buildings and roof structures. He is also a named inventor on seven US patents and the author of over 50 research papers and technical notes.

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TUESDAY, MAY 21, 2024: 2:15 PM – 3:15 PM: CATALINA BALLROOM

ASCE 7-22 AND THE EFFECT ON COLD-FORMED STEEL PROGRESSIVE

CONTINUING EDUCATION - 1 PDH / LU | HSW

Approved Continuing Education

Significant changes have been made to the ASCE 7-22 loading standard. ASCE 7-22 standard has been adopted by IBC 2024 and the 8th Edition (2023) of the Florida Building Code and will present new challenges to cold-formed steel (CFS) truss design. This presentation will focus on the changes made in the Snow & Wind loading provisions from ASCE 7-16 to ASCE7-22, including the new requirements for tornado loads. The effect these changes will have on CFS truss designs, bracing and connections will also be discussed.

Jacob Thompson, P.E., S.E.
TrusSteel

Jacob Thompson, P.E., S.E., is Senior Engineer for TrusSteel. TrusSteel is a provider of cold-formed steel (CFS) truss engineering and technology utilizing the proprietary TrusSteel system. Thompson has been involved with wood and CFS truss components for the past 20 years. He holds a Bachelor of Science degree in Civil Engineering and a Master of Science degree in Structural Engineering. He is a licensed Professional and Structural Engineer. He is also a member of the Cold-Formed Steel Engineers Institute (CFSEI) and American Institute of Steel Construction (AISC) and has participated on several subcommittees of the American Iron and Steel Institute's (AISI) Committee on Specifications.

TrusSteel
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TUESDAY, MAY 21, 2024: 3:30 PM – 4:30 PM: GRAND BALLROOM (SALONS B & C)

KEYNOTE SPEAKER

DEVELOPMENT OF STANDARDS FOR AUSTRALIAN STEEL FRAMED HOUSES SUBJECT TO WILDFIRE ATTACK

CONTINUING EDUCATION - 1 PDH / LU|HSW

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In 2009, following a major wildfire in Victoria, Australia, where 173 lives were lost and over 2,000 houses and 3,500 buildings were affected, including more than 2,000 destroyed, the National Association of Steel-Framed Housing, Inc. (NASH) investigated options for the safer design of houses subject to wildfires and constructed with cold-formed steel (CFS).

A review of the Australian Standard AS 3959, Construction of Buildings in Bushfire Prone Areas, was undertaken, and no benefits were given to houses constructed from non-combustible materials. AS 3959 is based upon envelope protection, which protects the house from embers and heat from wildfire and provides weatherproofing and insulation to the house. It was also based on using a modified standard fire test to determine the suitability of the outer envelope system for the house. AS 3959 specifies bushfire attack levels (BAL) for different fire loads, depending on the types of vegetation surrounding the house. The standard BALs are 12.5, 19, 29, 40 and Flame zone (FZ), which represents the heat load of the building in kilowatts per square meter. Different design requirements are set for each BAL.

Over 80% of house fires resulted from ember attack, rather than heat loading. Also, the heat curve for a wildfire bears no resemblance to a standard fire test. The house chosen as an archetype for this study represented a typical rural house and consisted of a:

- Steel clad roof supported by a steel frame/truss.
- Brick veneer or light-weight wall cladding with steel framing.
- Concrete slab on ground or elevated steel subfloor.
- Typical non-combustible glass or mineral wool to meet energy efficiency. requirements.

It was considered that this form of construction would provide a robust, economical solution for a house constructed in areas subject to wildfire attack, since both the exterior claddings and exterior cavities were constructed from non-combustible materials. This reduced the risk of combustion as the embers would not cause any issues unless they reached the internal part of the building.

A full-scale burn-over test was performed by CSIRO on a small house with a realistic heat profile, and the structure performed well. It highlighted some deficiencies, which were addressed and then subjected to small-scale fire tests. In addition, fire engineering was used to design and specify various details. The results of this work was incorporated into a NASH Standard for non-combustible construction in wildfire areas, which runs in parallel to the Australian Standard AS 3959. The NASH Standard for Steel Framed Construction in Bushfire Areas 2021 offers significant cost savings particularly at higher BAL levels. The NASH Standard provides solutions for non-combustible construction of:

- Roof systems with non-combustible cladding.
- Wall systems including windows and doors.
- Floor systems.
- Carports, pergolas, verandahs, and decks.
- Detached garages and sheds.

Ken Watson
National Association of Steel-Framed Housing Inc.

Ken Watson is the Executive Director of the National Association of Steel-Framed Housing (NASH), which is the Australian industry association for the use of cold-formed steel (CFS) in buildings. NASH covers all building types using CFS including detached housing, town houses, row houses, aged care facilities, schools, hospitals, hotels and apartments. Traditionally, NASH has concentrated on low-rise buildings but is expanding its activities into mid-rise construction.

Watson is Chairman of the NASH Standards Committee, which is responsible for developing Standards for the steel framing industry that are subsequently referenced in the Australian Building Code. These standards cover structural design and design for wildfires for steel-framed buildings. With the move into mid-rise construction, research is currently being undertaken by Australian Universities into fire design, acoustic design, structural design and robustness, which will be incorporated into NASH Standards and Handbooks.

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TUESDAY, MAY 21, 2024: 5:30 PM – 9:00 PM

DINNER & SOCIAL EVENT

SPONSORED BY EXPO PLATINUM SPONSORS

PIMA AIR AND SPACE MUSEUM

Enjoy a relaxing evening at the home of the Arizona Aviation Hall of Fame surrounded by nearly 400 aircraft from a Wright Flyer to a 787 Dreamliner. CFSEI will have access to the engine main hanger with over forty planes and exhibits.

Pima Air & Space Museum is an aerospace museum in Tucson, Arizona. The museum opened to the public in May of 1976 and features about four hundred aircraft spread out over eighty acres on a campus occupying 127 acres. Over the past forty years, the museum has grown immensely and today encompasses six indoor exhibit hangars (three dedicated to WWII). Pima Air & Space Museum has also been the home to the Arizona Aviation Hall of Fame since 1991.

The bus will leave the Loews Vantana Canyon Resort at 5:30 p.m. and arrive at the Museum between 6:15 and 6:30 p.m. The evening begins with happy hour (drinks and hors d'oeuvres). Dinner will be served at 7:15 p.m.

- 5:30 p.m. – Bus leaves the hotel.
- 9:00 pm. – Bus returns to the hotel.

TOP

WEDNESDAY, MAY 22, 2024: 9:00 AM – 10:00 AM: GRAND BALLROOM (SALONS B & C)

APPLIED ETHICS FOR ENGINEERS

CONTINUING EDUCATION - 1 PDH / LU

In this presentation, Brett Stewart of AXA XL explores various ethical pitfalls that engineers are likely to encounter in their daily work. Topics include how to identify and address issues concerning public safety, how far the obligation to maintain client confidences can extend, and strategies for recognizing and avoiding acts of perceived impropriety from solicitations to providing gifts to clients and public officials.

This presentation analyzes conduct against the National Society of Professional Engineers (NSPE) Code of Ethics and provides real world examples of how the Board of Ethical Review has decided similar cases. At the conclusion of this presentation, attendees will have a better understanding of ethical "gray areas" and will be able to develop contractual and behavioral safeguards to better manage client expectations and support the engineer's ethical decision-making process.

Brett Stewart
AXA XL

Brett Stewart is Manager of the Loss Prevention and Education department for the Design Professional unit of AXA XL. He is responsible for leading the effort to develop risk management and educational materials for AXA XL's design professional insureds to help firms manage their liability and business risks.

Stewart interfaces directly with architects and engineers, brokers and various industry organizations to promote issues that are relevant to the design community. Prior to his current role, he served the Design Professional group as Risk Manager for nine years and Senior Claims Examiner handling design professional claims for seven years. He is a licensed California attorney and was a litigator at two San Francisco law firms for eight years.

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WEDNESDAY, MAY 22, 2024: 10:15 AM – 11:15 AM: SALON A

CFS-NHERI PROJECT UPDATE

CONTINUING EDUCATION - 1 PDH / LU | HSW

The CFS-NHERI capstone building test program, coined CFS10, is a full-scale 10-story, cold-formed steel (CFS) framed building program planned for seismic testing under increasing, multi-directional earthquake motion intensity and subsequent live fire testing at the NHERI 6-DOF Large High-Performance Outdoor Shake Table (LHPOST6) facility at the University of California San Diego.

The CFS10 collaboration follows on successful system-level 2-story (CFS-NEES) and 6-story (CFS-HUD) efforts of the team. The new CFS10 test program will push the limits of CFS-framed construction — with the building height beyond current ASCE 7 limits and a wide range of construction techniques utilized within one specimen, including stick-framing, panelization, and modular construction. CFS10 is poised to generate valuable knowledge, accruing benefits not just for CFS-framed systems, but for all systems, through improvements in design standards such as ASCE 7, AISI S400 and construction handbooks.

Tara C. Hutchinson, P.E., Ph.D.
University of California, San Diego

Tara C. Hutchinson is a Professor in the Department of Structural Engineering at the University of California, San Diego with research interests in geotechnical, structural and earthquake engineering. Much of her efforts involve large-scale shake table and fixed reaction-type experimentation. Her research focuses on understanding the mechanisms that underlie the response of components of civil infrastructure during earthquakes and developing techniques to enhance their performance and hence reduce damage. Professor Hutchinson obtained her Ph.D. in 2001 at UC Davis and M.S. in 1995 at the University of Michigan, Ann Arbor. Prior to her current appointment at UC San Diego, she served on the faculty at the University of California, Irvine until 2007. Professor Hutchinson is active in her service contributions, serving on the Earthquake Engineering Research Institute (EERI) Board of Directors, the Earthquake Spectra and ASCE Journal of Architectural Engineering editorial boards, to name a few. She has received awards for her contributions in teaching and research, including the Excellence in Undergraduate Education Award, the National Science

Foundation Career Award, the Shamsher Prakash Research Award and the Western Seismic Safety Council Research Excellence Award to name a few. Her contributions are disseminated in more than 140 journal papers, 170 conference papers and 80 technical reports.

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WEDNESDAY, MAY 22, 2024: 10:15 AM – 11:15 AM: CATALINA BALLROOM

DEEP LEARNING-BASED DAMAGE DETECTION IN CONCEALED COLD-FORMED STEEL STRUCTURES USING GROUND PENETRATING RADAR

CONTINUING EDUCATION - 1 PDH / 1 LU|HSW

Cold-formed steel (CFS) is becoming increasingly prevalent in residential and commercial construction due to its cost effectiveness, high strength-to-weight ratio and fire resistance. As CFS buildings age and become more prevalent in hazard-prone areas, there's a need for a robust framework for structural condition assessment. Current assessment methods are limited by the presence of cladding on CFS structures.

To address this, Muhammad Taseer Ali of the University of Houston, proposes a two-part framework involving ground-penetrating radar (GPR) for data acquisition and deep learning, specifically the InternImage model, for data processing. The InternImage model utilizes a convolutional neural network (CNN) with deformable convolution DCNv3 to automate damage detection on concealed CFS structural members. The framework is demonstrated and evaluated for detecting various damage types on CFS load-bearing elements. The proposed approach has implications for automated assessment, particularly in post-disaster scenarios, providing direct access to concealed members without cladding removal. It also offers potential efficiency in time and cost for developing preventive maintenance strategies for aging CFS structures.

Muhammad Taseer Ali
University of Houston

Muhammad Taseer Ali has almost 10 years of experience in the construction industry. He has worked as a Structural Engineer in different companies in Pakistan, Middle East and the United States. He has managed engineering teams, executed structural design of cold-formed steel (CFS) buildings, and coordinated with cross-functional teams to deliver successful projects. Currently, Taseer is a part of Structures and Artificial Intelligence Lab (SAIL), where he is pursuing his Ph.D. in Structural Engineering from the University of Houston under the supervision of Dr. Vedhus Hoskere. His research includes a deep learning-based framework for structural condition assessment and health monitoring of Cold-Formed Steel Structures.

WEDNESDAY, MAY 22, 2024: 11:30 AM – 12:45 PM: GRAND BALLROOM (SALONS B & C)

LUNCHEON

AWARD WINNER PRESENTATIONS

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WEDNESDAY, MAY 22, 2024: 1:00 PM – 2:00 PM: SALON A

COLD-FORMED STEEL DIAPHRAGM DESIGN

CONTINUING EDUCATION - 1 PDH / LU | HSW

The analysis and design of floor and roof diaphragms intersect with cold-formed steel (CFS) structures in two unique ways.

AIA Approved Continuing Education

First, the shape of diaphragms in mid-rise CFS structures (commonly five to 10 stories) are often complex and irregular due to the most common occupancies of these types of structures – namely, residential occupancies such as dormitories, hotels and apartments. Such occupancies necessitate long, narrow floor plans organized around corridors, often incorporating many turns.

Second, a significant number of structures have diaphragms composed partially or wholly of cold-formed metal deck. Examples include bare metal deck at the roof level, gypsum concrete fill over metal deck and concrete over non-composite or composite metal deck. The specifications for the design of these components are found in AISI S100, North American Specification the Design of Cold-Formed Steel Structural Members and AISI S310, North American Standard for the Design of Profiled Steel Diaphragm Panels.

Engineers working in the design of CFS will likely be required to design diaphragms. This presentation will inform that process through discussion of the basic principles of diaphragm analysis, code requirements and industry guidelines, as well as through some practical examples for approaching unique design and detailing scenarios. The definitions of diaphragm rigidity — rigid and flexible idealization and semi-rigidity — and diaphragm regularity or irregularity from ASCE 7 form a starting point. This will also require investigation of seismic-specific requirements such as diaphragm design forces and use of load combinations including the over-strength factor.

The presentation will cover the basics of the design of diaphragms such as determination of internal forces and design of components of the diaphragm including chords and collectors. At this point, a discussion specific to metal deck diaphragms will be appropriate and will include an introductory-level approach to AISI S310, metal deck analysis, strength determinations and common testing procedures. How these become the shear strength and stiffness capacity tables that engineers are used to seeing will be briefly demonstrated.

The presentation will conclude with special design and detailing case studies. Addressing conditions such as large openings, reentrant corners, nonstacking elements of the lateral force-resisting system and/or unique drag strut conditions will be the focus of this portion. Reference will be made to resources such as AISI D310 and the Steel Deck Institute Diaphragm Design Manual (DDM4).

Zane Clark, P.E., S.E.
McClure

Zane Clark is the Structural Technical Lead for McClure, where he has been designing cold-formed steel (CFS) structures since 2015. Through his time at McClure, Clark has gained specialized expertise in the design of mid-rise, load-bearing CFS buildings. Clark's current role involves providing quality control and code compliance reviews of design documents produced by McClure's structural team as well as promoting technical education and training for the engineering staff. He is active with the ASCE/SEI Committee on Cold-Formed Steel Members, which is producing a design guide for CFS structures. His contribution is on the design of CFS lateral force-resisting systems.

Ian Micklethwaite, P.E.
ASC Profiles

Ian Micklethwaite is the primary Design and Technical Engineer for the Steel Deck Division of ASC Profiles, which is actively involved in the Steel Deck Institute (SDI). Micklethwaite has been working in the cold-formed steel (CFS) industry for the past eight years. Currently, he works on composite floor and roof deck design, which includes design modification to reflect ongoing building code updates as well as new product research and development. Previously, Micklethwaite has been a design engineer for CFS-framed buildings throughout the United States.

TOP

WEDNESDAY, MAY 22, 2024: 1:00 PM – 2:00 PM: CATALINA BALLROOM

RESIDENTIAL DESIGN BEYOND AISI S230

CONTINUING EDUCATION - 1 PDH / 1 LU | HSW

High-end custom residential cold-formed steel (CFS) projects that go beyond the scope of AISI S230, Standard for Cold-Formed Steel Framing – Prescriptive Method for One- and Two-Family Dwellings require capable engineering for a successful project. Most engineers do not understand CFS design well enough to provide a workable experience for the residential builder, and the engineers who do are usually not willing to take on single-family projects.

In this presentation, Don Wheeler, veteran CFS builder and consigliere, will discuss issues that have come up in past projects and offer constructive solutions for engineers and on-site framers when conflicts arise in the field. He will also address why engineers are the key to the future of CFS residential framing.

W. Donald Wheeler
Wheeler Steel Framing Supply

Don Wheeler is a seasoned, professional general contractor with over 50 years of experience in both residential and commercial projects with special emphasis in custom residential steel construction from foundation to finish. He is skilled in supervision, cost control, negotiations and finding creative solutions to construction challenges. Manufactured and installed steel trusses and pre-cut steel framing materials, including concrete form material.

Wheeler has extensive experience coordinating all phases of construction from permit to open house. At Wheeler Steel Framing Supply, Wheeler supervises the pre-cutting of steel framing material at the Fullerton warehouse location and works with onsite framers installing CFS framing material. He has also taught cold-formed steel (CFS) framing at Chaffey College for three years and has given presentations on CFS in Japan. He is active in several associations and has been featured in various professional publications.

WEDNESDAY, MAY 22, 2024: 2:15 PM – 3:15 PM: GRAND BALLROOM (SALONS B & C)

CFS – ASK AN EXPERT

CONTINUING EDUCATION - 1 PDH / LU

Cold-formed steel (CFS) design typically is not a course topic offered at universities. Therefore, engineers are on their own to self-educate. How? By attending a seminar or webinar on a specific topic. And by getting answers to a specific project questions.

Many engineers take advantage of the highly successful CFSEI "Ask an Expert" page on the CFSEI website or the CFSEI Hotline, 1-800-79STEEL. Inquiries cover the gamut of CFS applications, and we respond to them promptly.

This interactive Q&A session will focus on FAQs and your steel framing questions. Plan to attend and participate.

Don Allen, P.E., S.E., LEED AP
Association of the Wall and Ceiling Industry (AWCI)

Don Allen has worked in cold-formed steel (CFS) specialty engineering since 1990. He has been involved in projects in Africa, Europe and North America. He has presented on CFS in Colombia, China, Egypt, and now Arizona. Having worked for hundreds of specialty contractors over the years, and now representing a contractor-focused association, Allen understands the issues CFS specialty contractors face every day. As Director of Technical Services for the Association of the Wall and Ceiling Industry (AWCI), Allen works with contractors daily, helping them to be profitable and safe in an increasingly complex and competitive construction marketplace.

Patrick M. Hainault, P.E.
R.A. Smith, Inc.

Patrick Hainault is the Co-Director of Structural Services at raSmith in Brookfield, Wisconsin. His experience includes engineering design and staff management with raSmith and

Matsen Ford Design Associates, Inc., where he was a principal and senior engineer for 21 years. His expertise includes application of the latest technologies and design concepts to a wide variety of primary and secondary structures, including prefabricated systems. His engineering systems design experience includes structural steel, reinforced concrete, engineered masonry and wood. He was a structural designer for a concrete reinforcement supplier and a technician for a national material-testing firm. Hainault is past-chair of the CFSEI Executive Committee, a member of the SFIA Technical Committee and the AWCI Construction Technology Committee. He is a registered Professional Engineer in Wisconsin and several other states. He earned his Bachelor of Science degree in Civil Engineering from Marquette University.

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