CASTCONNEX®

innovative components for inspired designs

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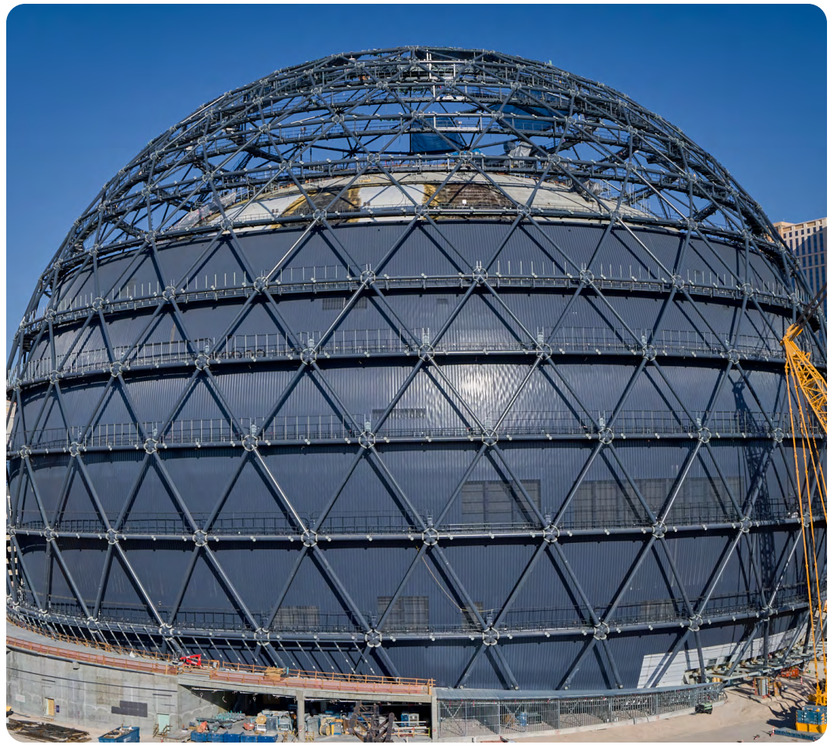
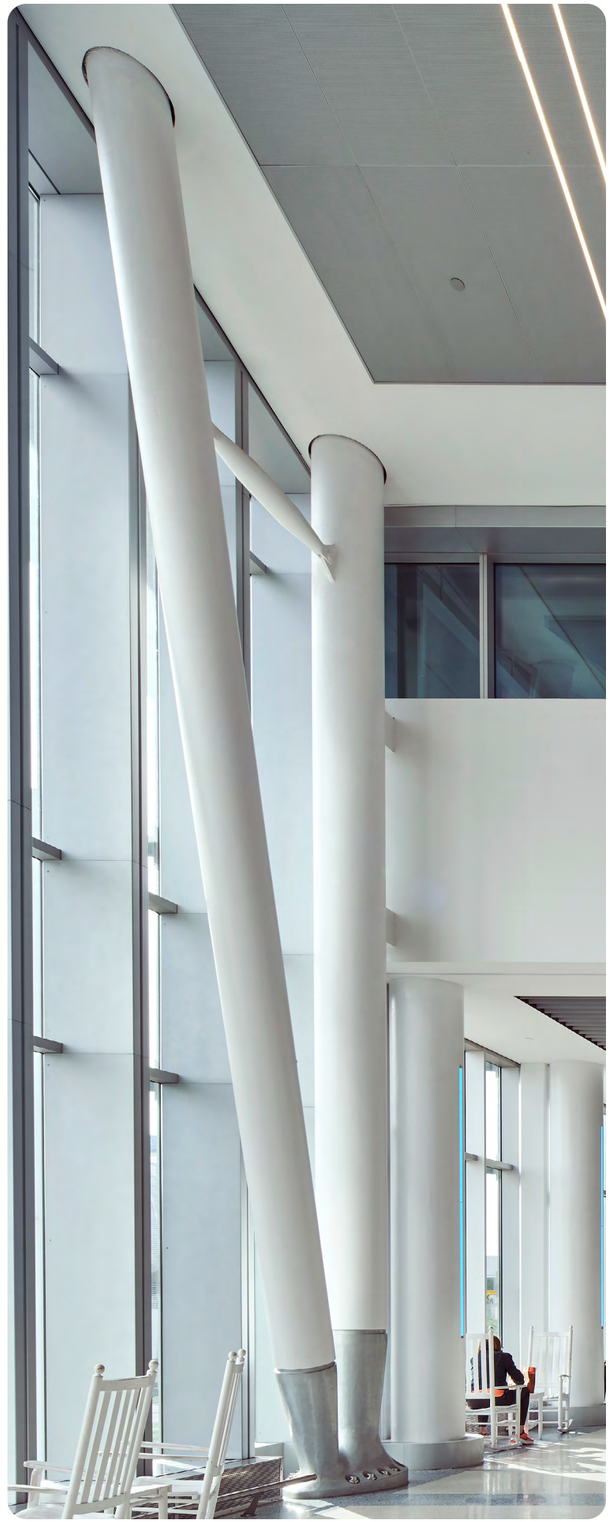


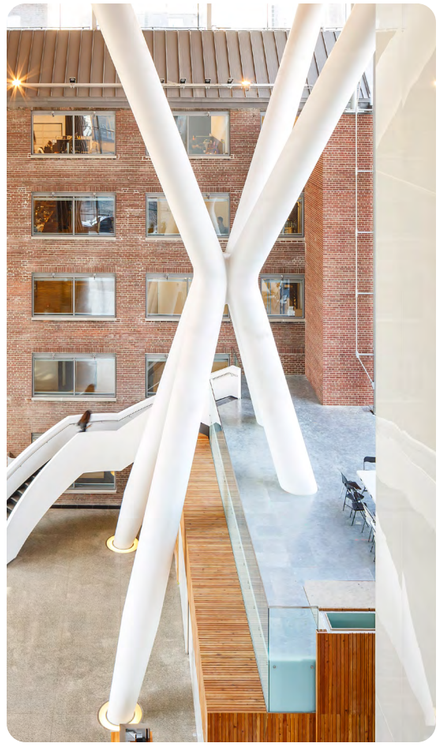


CAST CONNEX is dedicated to educating industry professionals about the design, manufacturing, and use of steel castings across sectors. The following are courses currently offered by Cast Connex.

To receive continuing education hours and certificates of completion, contact us to schedule live sessions for your firm.

info@castconnex.com

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CONTENTS

CASTINGS 101-26 | Steel Castings Fundamentals: Enhancing Aesthetics & Performance of Structures

COURSE DESCRIPTION

Buildings, bridges and other construction projects increasingly use cast steel components at key structural connections. The casting manufacturing process enables freeform geometric shapes otherwise unachievable using conventional rolled or fabricated steel shapes. As such, design and construction teams are supplementing their structural steel toolkit with steel castings to elevate aesthetics, enhance performance, and simplify the fabrication & erection of their projects. Given their organic shaping, castings are commonly used for architecturally exposed structural steel (AESS) details, complex and congested nodal connections, and for other special design considerations.

This presentation introduces the fundamentals and adoption of steel castings for modern AEC projects. Through project examples and sample casting typologies, attendees will evaluate when castings may be suitable for different applications and understand early design considerations to meet project architectural and structural performance goals. Further, participants will explore the cast steel design and manufacturing process, the role and coordination with a casting designer-supplier, and the differences between pre-engineered connectors and custom (project-specific) components. Best practices to successfully consider and specify steel castings to support architectural, structural and construction goals of key structural connections will be provided.

LEARNING OBJECTIVES

1. Identify opportunities for steel castings for architecturally exposed structural steel connections to improve structural performance, elevate aesthetics, and enhance the constructability of the structural frame or system.
2. Explore the casting manufacturing process from conceptual design to delivery, including the design, structural (finite element) analysis, testing and quality assurance and control.
3. Create a specification for custom (project-specific) castings which successfully communicates architectural and structural design criteria to casting designer-suppliers such that the casting products delivered to the project can safely and efficiently carry structural loads and achieve the desired aesthetics.
4. Evaluate differences between pre-engineered cast steel connectors and custom-designed steel castings, and the impact on the architectural quality of important gathering spaces and building programming.

Course Level	Introduction
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

CASTINGS 102-26 | Custom Steel Castings: Innovative Connection Solutions in Signature Projects

COURSE DESCRIPTION

Steel castings offer an innovative alternative to conventional structural steel design and unlock possibilities often unattainable using standard rolled shapes and fabricated assembles. The casting manufacturing process enables three-dimensional, freeform geometries that can be customized to address complex structural challenges and architectural goals. Enabling designers the capability to place material where it is most effective, steel castings are used to elevate aesthetic expression (architecturally exposed structural steel, AESS), resolve complex nodal geometry, facilitate efficient load transfer, and support constructability requirements, otherwise difficult to achieve using conventional fabricated steel. As a result, design and construction teams are supplementing their structural steel toolkit with steel castings for key connection solutions in bridges, buildings and other structural applications.

This presentation explores how custom-designed steel castings have been applied in signature projects to solve project-specific architectural, structural, and construction challenges. With a fundamental understanding of what steel castings are, attendees will examine selected case studies, limitations of traditional connection approaches, the decision drivers that led teams to consider custom castings, and how innovative cast steel designs and solutions supported architectural goals, structural performance, economy, and erection efficiency. Attendees will extract broadly applicable lessons to help evaluate when custom steel castings may be a suitable connection solution for their own projects and identify when and how to consider steel castings during the design process.

LEARNING OBJECTIVES

1. Identify opportunities for steel castings for architecturally exposed structural steel connections to improve structural performance, elevate aesthetics, and enhance the constructability of the structural frame or system.
2. Study the casting manufacturing process from conceptual design to delivery, including the design, structural (finite element) analysis, testing and quality assurance and control.
3. Create a specification for custom (project-specific) castings which successfully communicates architectural and structural design criteria to casting designer-suppliers such that the casting products delivered to the project can safely and efficiently carry structural loads and achieve the desired aesthetics.
4. Explain how to incorporate cast steel components into frame analysis models of structural systems to realize the overall structural performance benefits (strength, stiffness, fatigue, safety) when using cast steel components.

Course Level	Introduction
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

CASTINGS 103-26 | Steel Castings for Aviation: Architectural Spaces and Structural Connections

COURSE DESCRIPTION

Airport passenger terminals and aviation facilities present a unique set of architectural and structural design challenges driven by their role as highly visible and often iconic gateways. Along with their need for long-span and column-free spaces, high occupancy and life safety requirements, and the requirement to remain operational during construction, these projects require innovative solutions to support elevated architectural quality, increased demand on structural connections, and ability to be constructed quickly under unique time and spatial constraints.

With a fundamental understanding of what steel castings are, this presentation examines how steel castings were evaluated, designed, and implemented in aviation infrastructure to meet architectural, structural, and construction goals. Through selected aviation project case studies, attendees will evaluate the decisions to include steel castings and compare it with conventionally fabricated steel details. Different casting typologies to resolve complex or irregular connection conditions and multi-directional force transfer will be explored, predominantly for Architecturally Exposed Structural Steel (AESS) applications. Participants will take away how to consider, specify, and implement steel castings for their own projects.

LEARNING OBJECTIVES

1. Identify opportunities for steel castings for aviation-related projects to elevate aesthetics, enhance structural performance, and enable the constructability of the structural frame or system.
2. Compare pre-engineered, standardized cast steel connectors and custom (project-specific) steel castings with conventionally fabricated steel details and their impact on aesthetics and performance.
3. Create a specification for custom (project-specific) castings which successfully communicates architectural and structural design criteria to casting designer-suppliers such that the casting products delivered to the project can safely and efficiently carry structural loads and achieve the desired aesthetics.
4. Study the construction of aviation-related projects and the methods in which cast steel components simplify fabrication methods and enhance erection schemes.

Course Level	Introduction
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

CASTINGS 104-26 | Steel Castings for Stadiums & Event Venues: Constructability, Performance, and Economy

COURSE DESCRIPTION

Stadiums, large event venues, and similar iconic structures host some of the world's most memorable sports and entertainment events. The design and construction of these projects present structural challenges, including long-span roof systems, large column-free seating areas, complex and highly loaded nodal connections, aesthetic considerations, plus unique construction schemes, timelines and budgetary constraints. Structural steel is commonly used to address these challenges and meet performance and economic goals. However, for key structural connections, conventionally fabricated details can be difficult to fabricate, and field tolerances can become challenging to control, aggravating risk and costs. To enhance solutions and mitigate risks, design and construction teams are using steel castings to supplement their structural steel toolkit.

With a fundamental understanding of what steel castings are, this presentation explores when and how steel castings have been successfully used on large-scale projects like stadiums and entertainment venues to enhance aesthetics (architecturally exposed structural steel, AESS) constructability, performance, and overall project economy while mitigating risks in fabrication and erection. Through relevant project case studies, attendees will compare fabricated steel details with cast steel solutions and study their impacts.

LEARNING OBJECTIVES

1. Identify opportunities for steel castings for stadiums and large event venue projects to elevate aesthetics, enhance structural performance, and enable the constructability of the structural frame or system.
2. Compare pre-engineered, standardized cast steel connectors and custom (project-specific) steel castings with conventionally fabricated steel details, and their impacts on fabrication and erection.
3. Create a specification for custom (project-specific) castings which successfully communicates architectural and structural design criteria to casting designer-suppliers such that the casting products delivered to the project can safely and efficiently carry structural loads and achieve the desired aesthetics.
4. Study the construction of stadium-related projects and the methods in which cast steel components simplify fabrication methods and enhance erection schemes.

Course Level	Introduction
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

CASTINGS 105-26 | Steel Castings for Tall Building Structures and Developments

COURSE DESCRIPTION

City skylines continue to evolve with striking high-rise structures with deep consideration for the human interface in their lower and upper architectural programming. Many of these structures rely on innovative frameworks to achieve bold architectural and structural goals. Steel is an ideal material for the construction of these mega structures; however, high member utilization in the frame can lead to very complex and highly stressed connections that pose difficult design challenges. These disturbed regions experience elevated tri-axial stress states for which typical structural analysis techniques, such as beam theory, do not apply. Traditionally fabricated steel nodal details or conventional steel forgings may not provide sufficient three-dimensional mechanical properties or geometric versatility to suit the structural requirements and construction schemes. As a result, design and construction teams may rely on cast steel components and high-performance engineered cast steel forgings.

This presentation explores recent tall building case studies which leveraged cast steel solutions or high-performance engineered cast steel forgings for key connection regions.

LEARNING OBJECTIVES

1. Explore opportunities to consider steel castings and engineered cast steel forgings for tall building and high-rise structures to address complex geometry and elevated triaxial stress states within connection regions.
2. Compare conventionally fabricated details or conventional forgings with steel castings or engineered cast steel forgings to understand differences and the applicability of these alternatives.
3. Describe the key steps in the design and manufacturing process steel castings and engineered cast steel forgings and how these processes achieve the necessary geometry and mechanical properties.
4. Discuss best practices when evaluating and specifying steel castings and engineered cast steel forgings such that the engineered solution is appropriately engineered and delivered.

Course Level	intermediate
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

CASTINGS 106-26 | Steel Castings for Transportation, Transit-Oriented Development, and other Dense Urban Environments Projects

COURSE DESCRIPTION

Transit-oriented development (TOD) projects present highly constrained, people-focused conditions that require careful coordination between architecture, structure, and construction. These projects create vibrant spaces, but during construction, they navigate limited site access, tight staging, integration with existing infrastructure, and the need to maintain ongoing operations. The freeform capabilities of the casting manufacturing process enable novel structural steel solutions otherwise not possible using conventional fabricated methods, to enable compact, highly efficient connection geometry, simplify complex node design, and support constructability within restricted urban contexts, often for architecturally exposed structural steel (AESS). Design teams are supplementing their structural steel toolkit with steel castings to enhance performance and offer versatile solutions to address these challenges.

This presentation explores how pre-engineered and custom-designed cast steel components have been applied for transit-oriented developments, transportation and other dense urban environment projects. Through selected case studies, attendees will evaluate the applicability and limitations of alternatives and best practices for specifying them into project design and specifications.

LEARNING OBJECTIVES

1. Identify opportunities for steel castings for transportation-related projects to elevate aesthetics, enhance structural performance, and enable the constructability of the structural frame or system.
2. Compare pre-engineered, standardized cast steel connectors and custom (project-specific) steel castings with conventionally fabricated steel details and their impact on aesthetics and performance.
3. Create a specification for custom (project-specific) castings which successfully communicates architectural and structural design criteria to casting designer-suppliers such that the casting products delivered to the project can safely and efficiently carry structural loads and achieve the desired aesthetics.
4. Study the construction of transportation and other projects built in dense urban environments in which cast steel components simplify fabrication methods and enhance erection schemes.

Course Level	Introduction
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

CASTINGS 107-26 | Steel Castings for Cultural, Civic, Education, and Healthcare Projects

COURSE DESCRIPTION

Buildings, bridges and other structural steel projects increasingly use cast steel components at key structural connections. The casting manufacturing process enables freeform geometric shapes otherwise unachievable using conventional rolled or fabricated steel shapes. As such, design and construction teams are supplementing their structural steel toolkit with steel castings to elevate aesthetics, enhance performance, and simplify the fabrication & erection of their projects. Given their organic shaping, castings are commonly used for architecturally exposed structural steel (AESS) details, complex and congested nodal connections, and other special design considerations. They are commonly used for cultural, civic, education, and healthcare projects.

This presentation introduces steel castings and their use for cultural, civic, education, and healthcare projects. Numerous examples of how custom-designed and pre-engineered steel castings have been used to enhance structural performance, and architectural design will be included for each of these sectors with special attention to how castings fit within the unique constraints to the design and budget of each example.

LEARNING OBJECTIVES

1. Identify applications for steel castings to increase aesthetic quality, structural performance, and resilience of critical healthcare structures.
2. Explain a wide variety of ways that custom and pre-engineered castings can be used in schools and university buildings as key design elements, including scope from Architecturally Exposed Structural Steel (AESS) to seismic construction.
3. Explain the aesthetic and performance advantages of cast steel connection to various Civic/Cultural building stakeholders. Identify innovative cast steel solutions to achieve structural and architectural project goals.
4. Create a specification and details for castings which successfully communicates architectural and structural design criteria to casting suppliers such that the casting products delivered to the project can safely and efficiently carry structural loads and achieve the desired aesthetics.

Course Level	Introduction
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

CASTINGS 108-26 | Steel Castings for Enhanced Performance & Longevity of Bridge Structures

COURSE DESCRIPTION

Steel casting manufacturing offers the ability to produce steel connections and components in geometries that would otherwise be unimaginable using conventional steel fabrication techniques. This unlocks significant design potential from creating connections that are sculpted and optimized to enhance architectural quality and structural performance, improve joint types and constructability, reduce construction risk, and economize the overall structure – particularly for steel bridges.

This presentation explores how steel castings have been successfully integrated into various steel bridge projects, including rail, highway, and pedestrian bridges. Through bridge-related project case studies, attendees will study how steel castings are designed for these structures while exploring the performance and economic benefits they offer. This includes improving fatigue life, extending service life and coatings longevity, decreasing tonnage, reducing deflections and simplifying fabrication.

LEARNING OBJECTIVES

1. Identify opportunities for steel casting use in bridge structures to improve structural performance, reduce deflections, and better predict structural responses.
2. Explain how steel castings can improve the fatigue life of bridges structures and extend their service life.
3. Explore custom-designed (project-specific) castings and pre-engineered castings to facilitate both welded and bolted connection details to improve constructability and minimize construction risks.
4. Examine how castings are designed to reduce material tonnage, improve coating performance & longevity, and simplify fabrication to reduce initial and long-term costs and maintenance.
5. Describe how the use of castings can influence architectural quality of expressed bridge forms.

Course Level	Intermediate
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

CASTINGS 109-26 | Cast Steel Connection Solutions for Timber and Steel-Timber Hybrid Projects

COURSE DESCRIPTION

Steel and timber hybrid construction offers designers the ability to leverage the best attributes of both materials for architectural and structural applications. Timber, at its core, is a naturally sourced material that offers warmth to spaces, and steel is a highly recycled material that offers strength and ductility in structural applications. Steel is often used at the connection points in timber structures, where stresses can be high and force flow paths can be complex. The steel casting process enables the design of organic, free-form connectors that are architecturally well suited to for use with timber; a noted warm, organic building material.

This presentation will explore case studies of both standardized "off-the-shelf" castings and custom-designed castings for architecturally exposed timber construction. Case studies include Vancouver International Airport: Pier D Expansion, the John W. Olver Design Building at UMASS Amherst, and UVIC Student Housing and Dining Centre. Steel-to-timber fastening details will be presented in the context of the case studies.

LEARNING OBJECTIVES

1. Identify opportunities for steel castings to improve the aesthetic of connections in timber construction.
2. Discuss possible connection joint types between steel castings with timber, and their applicability and limitations.
3. Explain the merits of various coating systems for exposed steel castings to project stakeholders.
4. Create a specification for custom-designed (project-specific) and castings which successfully communicates architectural and structural design criteria to casting suppliers such that the casting products delivered to the project can safely and efficiently carry structural loads and achieve the desired aesthetics.

Course Level	Introduction
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

CASTINGS 110-26 | Cast Steel Connection Solutions for Seismic Lateral Force Resisting Systems

COURSE DESCRIPTION

Designing and detailing structures to resist earthquakes loading is a complex and critical topic for engineers and architects to prevent catastrophic collapse and safeguard human lives. In addition to earthquake loads, design teams are also required to consider building behavior during seismic events and the intended performance.

This presentation will provide an introduction and technical discussion of commercially available castings that can be used in moment resisting frames, concentrically braced frames, and as yielding devices in concentrically braced frames or other axial load configurations. Attendees will learn the benefits of, and how to design with and specify, several cast steel connectors for use in seismically loaded steel structures.

LEARNING OBJECTIVES

1. Identify cast steel solutions (capacity-designed components and yielding devices) for a variety of steel seismic lateral force-resisting systems (LFRS).
2. Apply relevant code provisions in the structural design of capacity-designed connections that employ pre-engineered steel castings and write a specification that communicates the strength and ductility requirements during an earthquake event.
3. Write a specification for custom-designed (project-specific) cast steel connectors used in seismically loaded moment resisting or concentrically braced frames that communicates the necessary information to ensure that the systems provide adequate strength, stiffness, and ductility during an earthquake event.
4. Study the detailing requirements needed to achieve intended performance when specifying cast steel components for seismic lateral force resisting systems.

Course Level	Intermediate
Course Delivery Type	Live
Learning Units	1 LU/HSW

Category	Project Planning & Design
Prerequisite	None
Expiry Date	June 5, 2029.

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