PEO Oakville / CISC

- Sarah Majlesi, MSc., P. Eng., PMP, CISC Senior Engineer, Cold Form Steel
- Suja John, P. Eng., Manager, Business Initiatives

CISC's Mission and Role

National Industry Voice

CISC is Canada's voice for the steel construction industry.

Strengthen, Promote and Advance

CISC advances and strengthens the steel construction industry.

Promoting Innovation and Sustainability

CISC promotes innovation, sustainability, and excellence in steel design and construction practices.

Education and Certification Support

Providing technical resources, professional development, and certification to support industry growth and expertise.

Collaborative Industry Partnerships

Working with engineers, fabricators, and architects to advance steel construction standards and competitiveness.

CISC / Engineers Partnership

Access to Industry Standards

CISC provides engineers with up-to-date industry standards and technical innovations essential for modern engineering.

Collaboration and Networking

CISC fosters collaboration through joint projects, technical initiatives, and peer networking opportunities. We also have a Steel Solution Centre, where we answer your questions on steel design of buildings and bridges.

Focus on Sustainable Construction

CISC supports delivering sustainable, efficient steel construction solutions for engineering professionals.

Featured CISC Products

Handbook of Steel Construction - 12th Edition, 2nd Revised Printing

$409.00

CISC Connections 1: Design of Steel Connections (2nd Ed.)

$2,295.00

Single Storey Steel Building Design - Session 1 (course)

$340.00

CISC Connections 2: Design of Steel Connections (2nd Ed.)

$2,395.00

Seismic Design of Steel-Framed Buildings Session 1 — Introduction

$195.00

Session 3: Introduction to the Dynamic Analysis of Steel Structures for Seismic Design – Part 2

$195.00

Session 3: Introduction to the Dynamic Analysis of Steel Structures for Seismic Design – Part 1

$195.00

Introduction to Modelling and Analysis of Steel Frame Structures Session 1 & 2

$350.00

Complimentary Resources

Sort by BEST SELLING

CISC Guide for Specifying Architecturally Exposed Structural Steel, 3rd Edition (PDF)

$0.00

Steel Design for Low Seismicity

$0.00

An Excerpt of Connections 2: Connection Basics (Introduction and Review)

$0.00

Gerber Roof Girders

$0.00

Mid-Rise Cold-Formed Steel Construction For Your Next Project!

$0.00

An Excerpt of Connections 1: Introduction - Part 1

$0.00

An Excerpt of Connections 1: Introduction - Part 2

$0.00

The Steel Handbook – Gems and Common Questions

$0.00

Cold-Formed Steel: What, Where & Why?

$0.00

Top Things You Should Know About HSS Connections

$0.00

Cold Formed Steel Codes & Standards

Sort by DATE, NEW TO OLD

CSSBI C1-25: Certificate of Design and Manufacturing Conformance with NBC 2020

$0.00

A Guide to Fire & Acoustic Data for Cold-Formed Steel Floor, Wall and Roof Assemblies

$0.00

CSSBI 61-24 Technical Memo

$0.00

CSSBI 61:24 - Product Certification of Cold-Formed Steel Framing Members

$0.00

CSSBI S8-2024, Lightweight Steel Framing, Member Selection Guide and Tables

$0.00

CSSBI S17-2017: Guide Specification for Steel Building Systems

$0.00

CSSBI S6-2019: Guide Specification for Lightweight Steel Framing

$0.00

CSSBI S8-2018: Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products

$0.00

CSSBI S5-2019: Guide Specification for Wind Bearing Steel Studs

$0.00

CSSBI S3-2019: Criteria for the Design of Composite Slabs

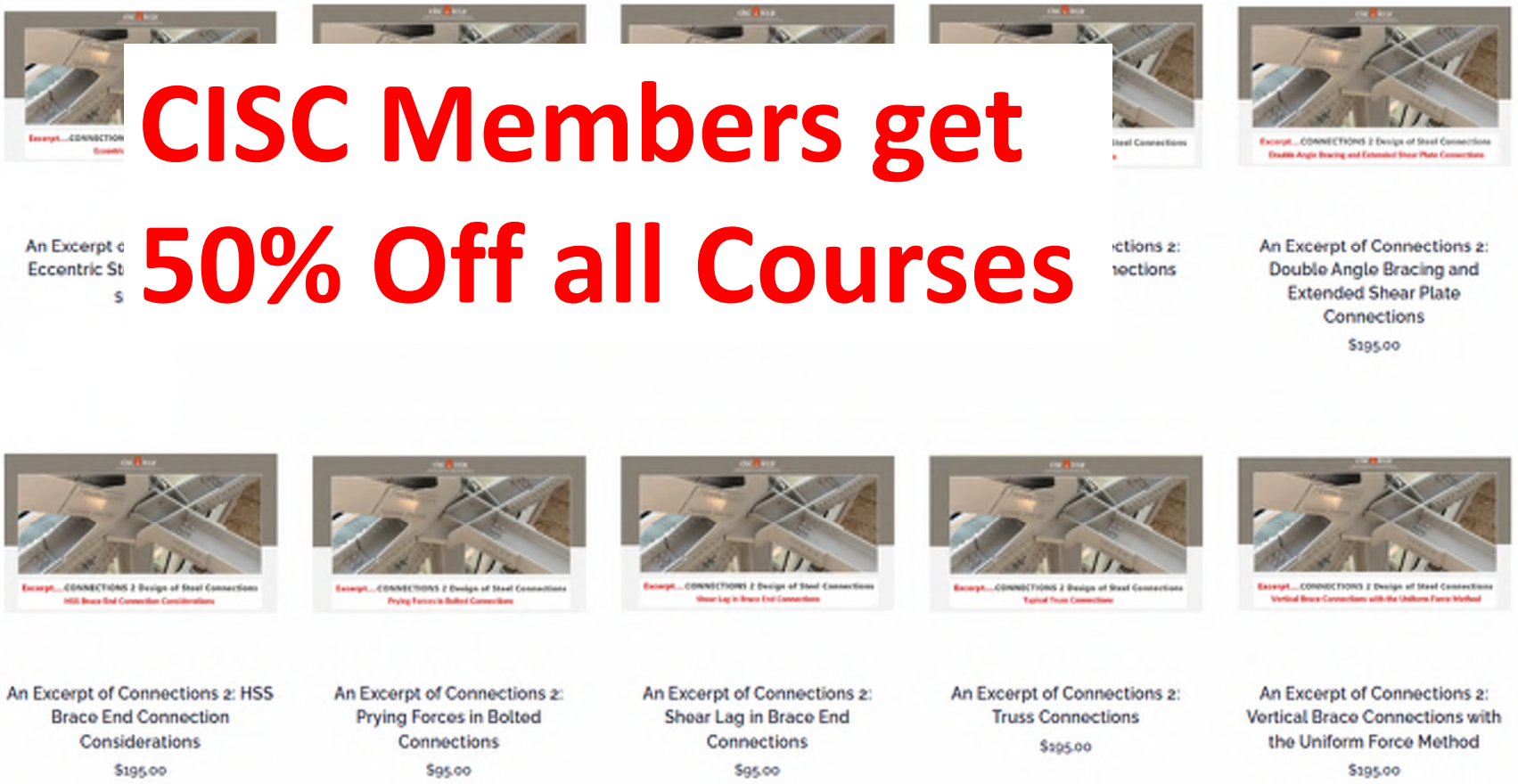
$0.00

CISC Engineering Updates

Courses, Design Aids, and Case Studies

Courses

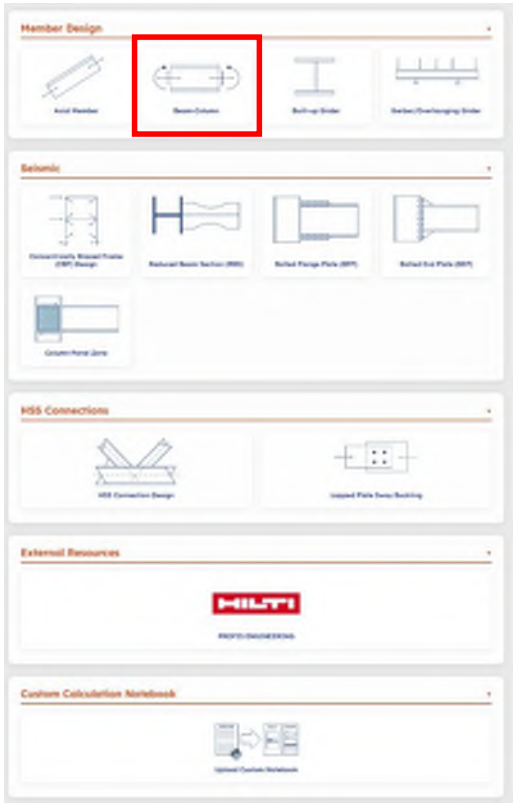
CISC Members get 50% Off all Courses

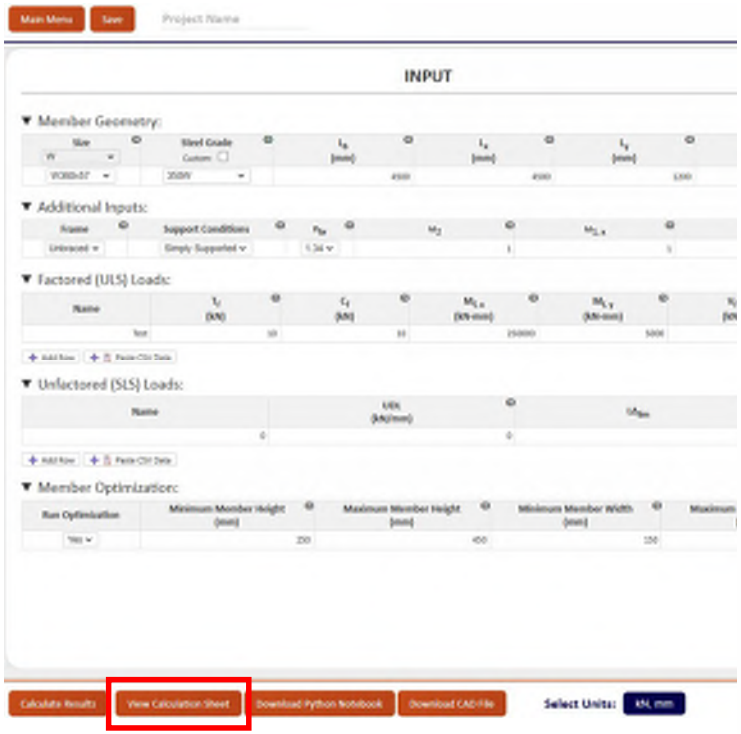


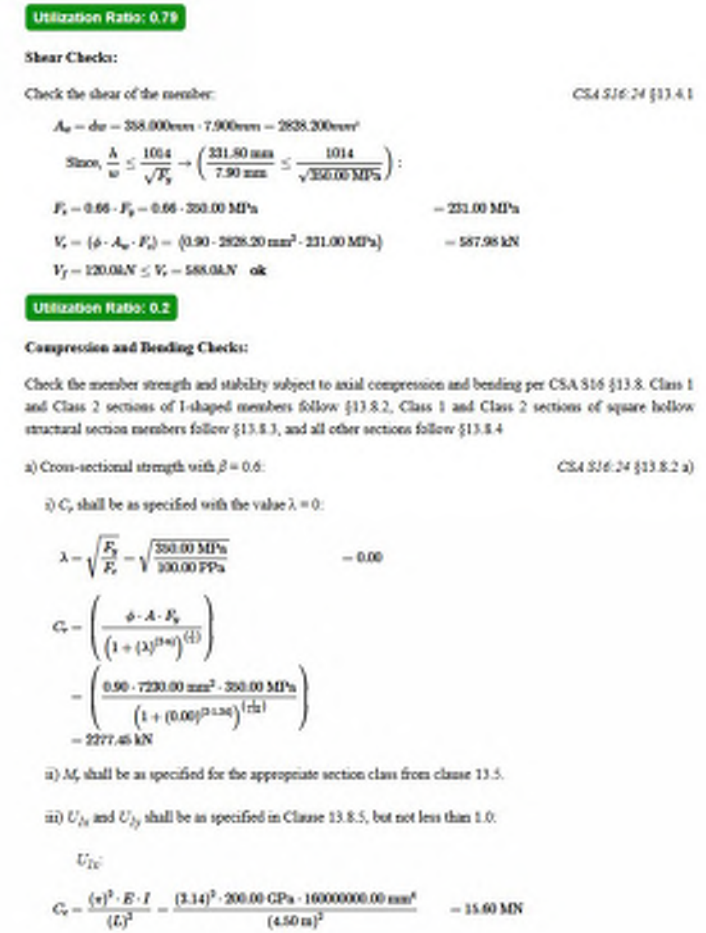
CISC Engineering Updates

Courses, Design Aids, and Case Studies

Online Design Aids







Canada's premier steel construction conference returns in 2026, taking Canada's premier steel construction industry gathering to Vancouver, British Columbia. Stay tuned for more updates, coming soon!

The Canadian Steel Conference 2026
November 3 and 4, 2026
Fairmont Hotel Vancouver
900 West Georgia St., Vancouver, BC.
V6C 2W6

The CISC Awards of Excellence in Steel Construction are the most prestigious signature events across Canada.

Teams are rewarded for excellence for the realization of their exceptional projects in steel. Projects showcase complexity, innovation, beauty, uniqueness, and originality, amongst many other noteworthy attributes. Hundreds of nominations are received yearly; Engineers, Architects, Fabricators, Contractors and developers, as key stakeholders of the steel construction industry submit their projects individually or in teams. The best finalists are picked by a distinguished jury of renown Architects, Engineers and Steel Industry connoisseurs, and the winners in the various categories are selected and announced at the Awards Ceremony and dinner. These ceremonies offer an opportunity for the teams to shine and for all industry to appreciate, admire and applaud the immensely talented Canadian Steel Industry.

2024 | 2022 | 2019 | 2017 | 2015 |

CISC ON Region Awards of Excellence in Steel Construction

April 08, 2025

Steam Whistle Brewing – Locomotive Hall 255
Bremner St., Toronto, ON M5V 3M9

CANADIAN INSTITUTE OF STEEL CONSTRUCTION
INSTITUT CANADIEN DE LA CONSTRUCTION EN ACIER

Thank You

Designing with Cold-formed Steel

By Sarah Majlesi
CISC (Canadian Institute of Steel Construction)

Sarah Majlesi, MSc., P.Eng., PMP

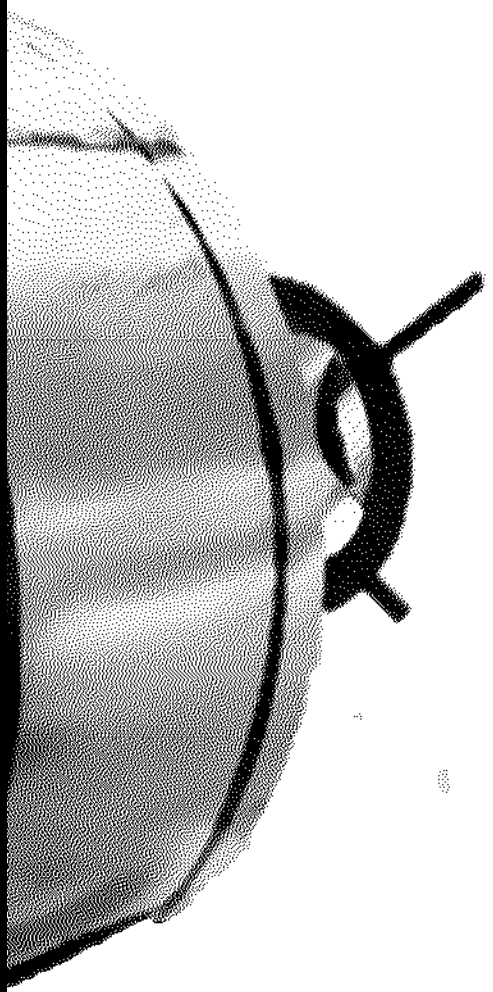
About me

- Senior structural engineer at CISC (Canadian Institute of Steel Construction)
- Cold-formed steel (CFS) design expert working in the industry exclusively for the past 10 years
- Project manager of CISC CFS (prev. CSSBI) committees.

Presentation Outline

- Introductions
- Wall and Floor Framing
- Cladding Systems- Roofs and Siding
- Steel Decks: Composite floor and Roof decks
- Closing/Q&A

Introductions

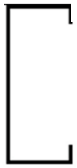


Cold-formed Steel Main Specification (Standard)

CSA S136-2027 in the works!

Cold-formed Steel Framing Sub-Standards

What is Cold formed Steel (CFS)?



Production

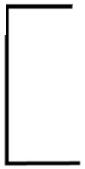
Manufactured from sheet steel, cold-formed steel members are either roll-formed or press braked with the former being the most common method of production.

Cold-working process

The term 'Cold' in CFS refers to cold-working processes performed at near room temperatures.

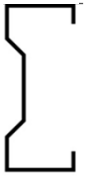
Lightweight

Thin-gauge sheets causes low unit weight with enhanced variety of shapes and usage.



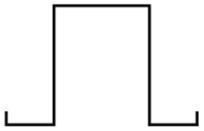
Properties

Increases in yield strength and ultimate strength of steel as a result of cold - forming.



Steel shapes

Two common CFS shapes used in construction industry: Structural shapes (C's, Z's etc.) and panels (cladding, decking etc.)



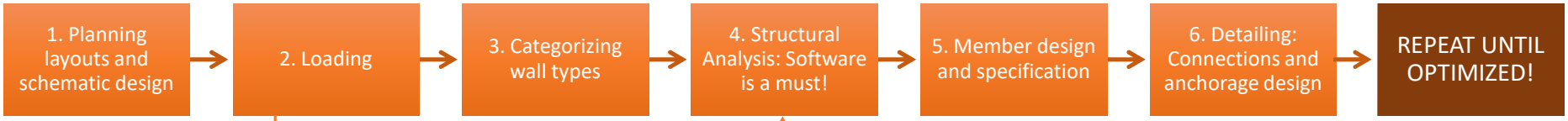
Financials

Higher strength and the use of less material overall creates a decrease in construction costs.

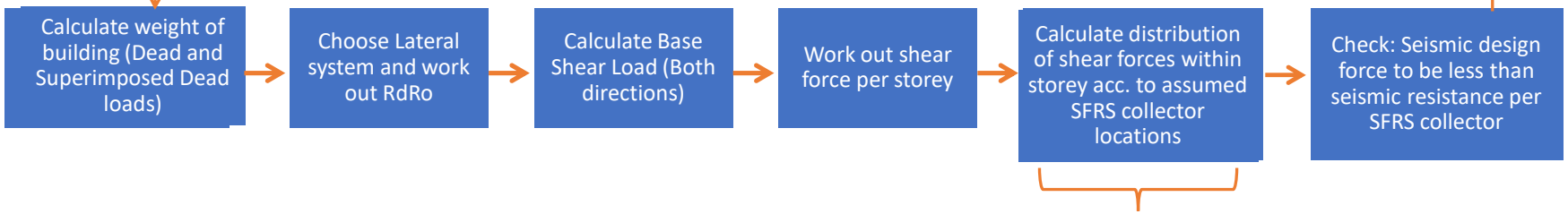
CFS Advantages

- 100% Recyclable
- Non-combustible
- Durable
- Increased strength
- Aesthetically pleasing

CFS Design Workflow:



Steps for Seismic Load Considerations (Iterative):



Why Load Tables?

Sample equations required for Nominal Distortional Buckling Strength of typical C-Section in Flexure, M_{nd}

$$M_{nd} = \left(1 - 0.22\left(\frac{M_{crd}}{M_y}\right)^{0.5}\right)\left(\frac{M_{crd}}{M_y}\right)^{0.5} M_y$$ for $\lambda_d \geq 0.673$

Ref.: CSA S136-16, Eqs. F4.1-2 & F4.1-3

$$\lambda_d = \sqrt{M_y / M_{crd}}$$

$$M_{crd} = S_f F_{crd}$$

Ref.: CSA S136-16, Eq. 2.3.3.3-1

$$F_{crd} = \beta \frac{k_{\phi fe} + k_{\psi we} + k_{\phi}}{\tilde{k}_{\phi fg} + \tilde{k}_{\psi wg}}$$

Ref.: CSA S136-16, Eq. 2.3.3.3-2

$$\beta = 1.0 \leq 1 + 0.4(L/L_m)^{0.7}(1 - M_1/M_2)^{0.7} \leq 1.3$$

where L= Min (L_{crd}, L_m)

Ref.: CSA S136-16, Eq. 2.3.3.3-3

$$L_{crd} = \left(\frac{4\pi^4 h_o (1-\mu^2)}{t^3}\left(I_{xf}(x_{of} - h_{xf})^2 + C_{wf} - \frac{I_{xyf}^2}{I_{yf}}(x_{of} - h_{xf})^2\right) + \frac{\pi^4 h_o^4}{720}\right)^{1/4}$$

Ref.: CSA S136-16, Eq. 2.3.3.3-4

$$k_{\phi fe} = \left(\frac{\pi}{L}\right)^4\left(EI_{xf}(x_{of} - h_{xf})^2 + EC_{wf} - E\frac{I_{xyf}^2}{I_{yf}}(x_{of} - h_{xf})^2\right) + \left(\frac{\pi}{L}\right)^2 GJ_f$$

Ref.: CSA S136-16, Eq. 2.3.1.3-3

Framing
Walls and Floors

Non Load Bearing Walls

Interior

Drywall partitions.

Minimal wind load.

Nonstructural CFS framing-AISI S220

Exterior

Curtain wall support.

Wind load and minimal dead load.

Structural CFS framing-AISI S240

Load Bearing Walls

Interior

Dead load. Minimal wind load.

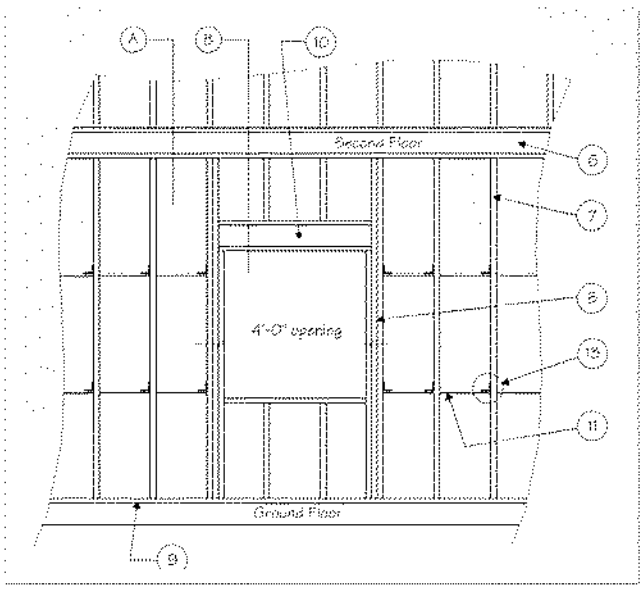
Structural CFS framing-AISI S100 (S136) & S240

Exterior

Wind load and axial dead load.

Structural CFS framing-AISI S240

Resources
Wall Framing



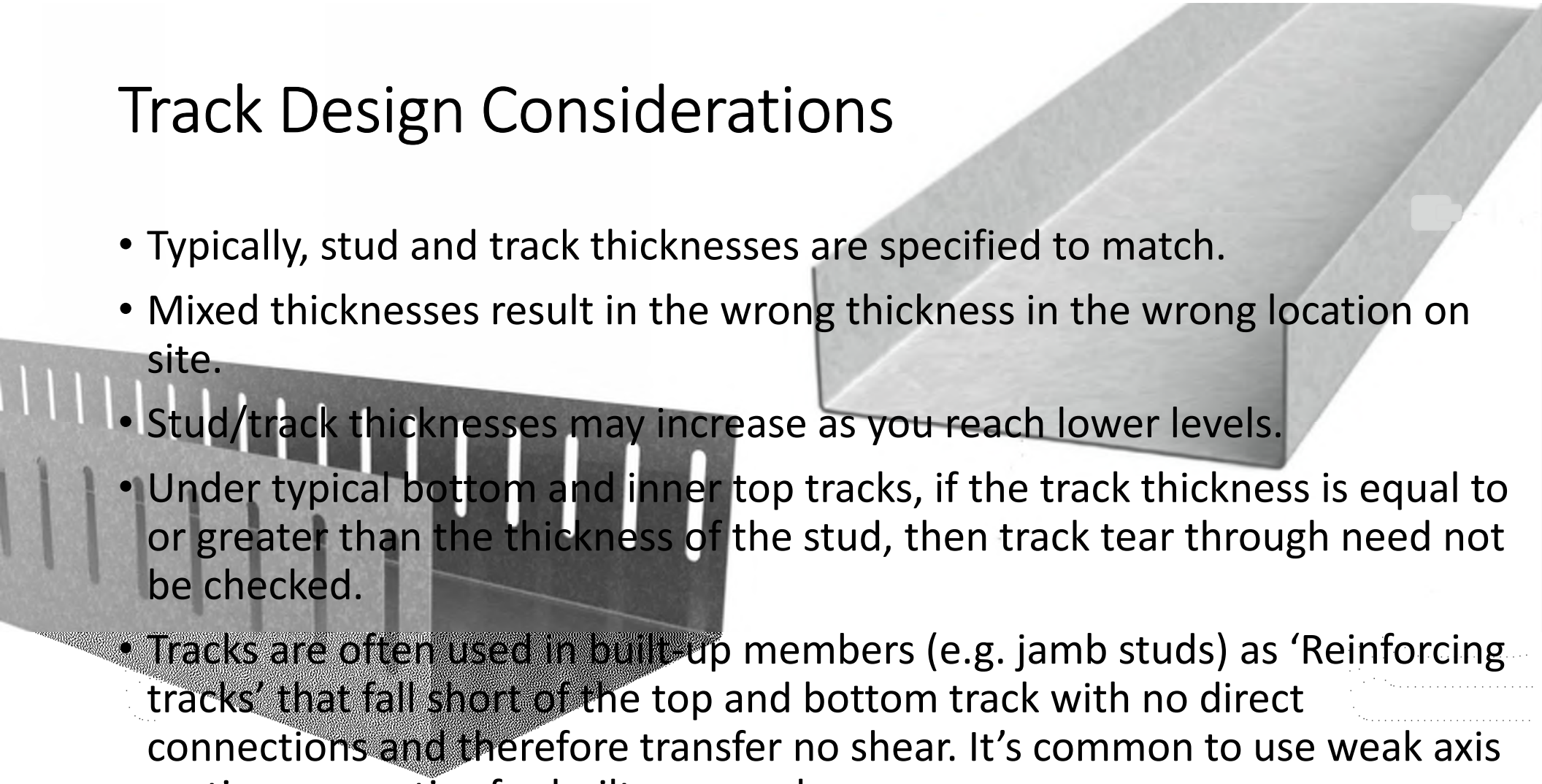
CFS Component	Standard/Design Aid
Studs	CSSBI 58/61 certification program, CSSBI 51 (AISI Design Guide D110), CFSEI B and W Series Technical Notes
Tracks (ledger and rim)	AISI S100 (S136), CFSEI TN W104-10
Bridging	Manufacturer requirements
Clips/connectors	Manufacturer reports and data
Fasteners	Manufacturer load charts, AISI S100 (S136), CFSEI Technical Notes F Chapter
Headers	AISI S220 or S240 as applicable, CFSEI TN W200-09
Jamb studs	See above for Studs

CFS Walls

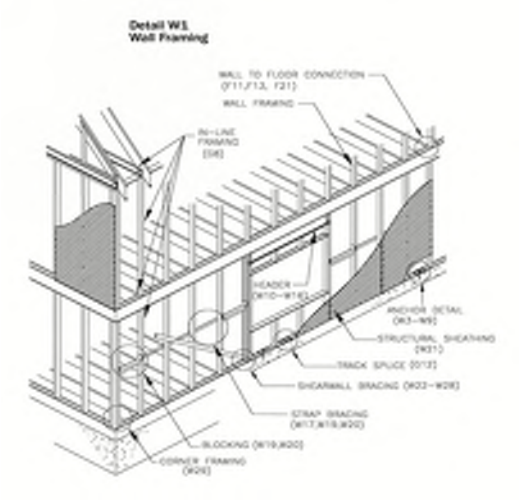
Studs

• **Design Limit States:**	• **Reference:**
Shear……	AISI S100 (S136), Sections G2 and G3
Yielding……	Considered part of Global Buckling- AISI S100 (S136) Section F2
Local Buckling……	AISI S100 (S136) Section F3 (Potential Global buckling (or yield) strength reductant)
Distortional Buckling……	AISI S100 (S136), Section F4
Lateral-Torsional (Global) Buckling……	AISI S100 (S136,) Section F2
Web Crippling……	AISI S100 (S136) Section G5 and G6
Deflection……	
Interaction of the above……	

Track Design Considerations



- Typically, stud and track thicknesses are specified to match.
- Mixed thicknesses result in the wrong thickness in the wrong location on site.
- Stud/track thicknesses may increase as you reach lower levels.
- Under typical bottom and inner top tracks, if the track thickness is equal to or greater than the thickness of the stud, then track tear through need not be checked.
- Tracks are often used in built-up members (e.g. jamb studs) as ‘Reinforcing tracks’ that fall short of the top and bottom track with no direct connections and therefore transfer no shear. It’s common to use weak axis section properties for built up members.

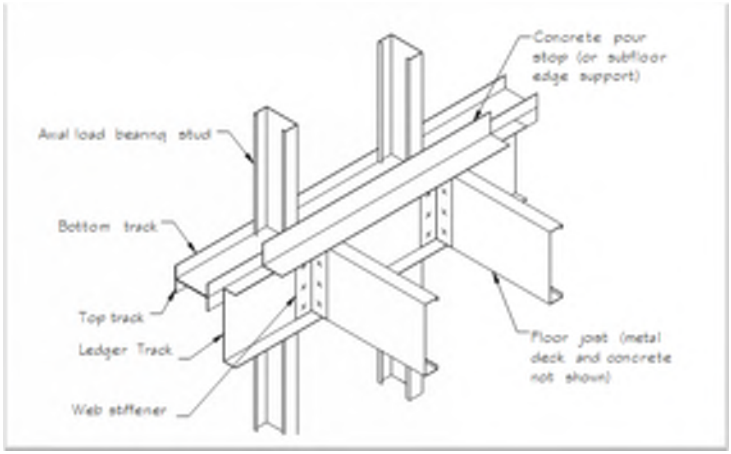


Typical Details: Wall Framing

- CSSBI→Resources→Drawings
- CFSEI→Publications→Construction Details
- SSMA→Technical Library→Construction Details
- AWCI Technology Center→Technical Resources →CAD Detail Library

Resources

Floor Framing

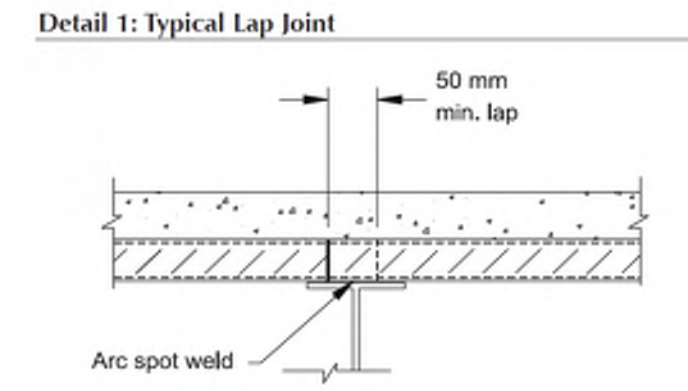


CFS Component	Standard/Design Aid
Joists	AISI S100 (S136)/CSSBI 58/CFSEI TN J100/CSSBI 51 (AISI Design Guide D110)
Blocking	AISI S240 (S136)/ Standard Practice
Tracks (Ledger and rim)	AISI S240 (S136)/CFSEI TN FC101-22
Clips/connectors	ICC AC261/AISI Research Report RP05-6
Fasteners	Manufacturer load tables, AISI S100 (S136), CFSEI Technical Notes F Series
Stiffeners	AISI RP05-6/CFSEI TN F100-09

CFS Floors

Joists

• **Design Limit States:**	• **Reference:**
Yielding	AISI S100 Section F2
Shear	AISI S100 Sections G2 and G3
Deflection	AISI S100 Section L1 and Appendix 1 or L2
Vibration	L/480 live load deflection or Concrete slab provisions
Web Crippling	AISI S100 (S136) Section G5 & G6
Distortional Buckling	AISI S100 (S136) Section F4/CFSEI TN G101
Combination of the above (e.g. effect of Local Buckling)	



Typical Details: Floor Framing

- CSSBI→Resources→Drawings
- CFSEI→Publications→Construction Details
- SSMA →Technical Library →Construction Details
- AWCI Technology Center →Technical Resources →CAD Detail Library

CSSBI 61 Certification Program

Product Certification of Cold formed Steel Framing Members

OVERVIEW

Developed by the Canadian Sheet Steel Building Institute (CSSBI), a division of CISC, this standard covers structural and non-structural grade cold-formed steel (CFS) framing members manufactured in Canada.

KEY REQUIREMENTS

- Products must meet or exceed CSA S136, ASTM, and AISI standards
- Third-party audits conducted twice per year (random sampling)
- Certification is plant-specific and valid for one year
- Designed for compliance with Building codes and Cold-formed steel design standards
- All cold-formed steel members that contain published load tables in the CSSBI 58 are eligible to becoming CERTIFIED products.

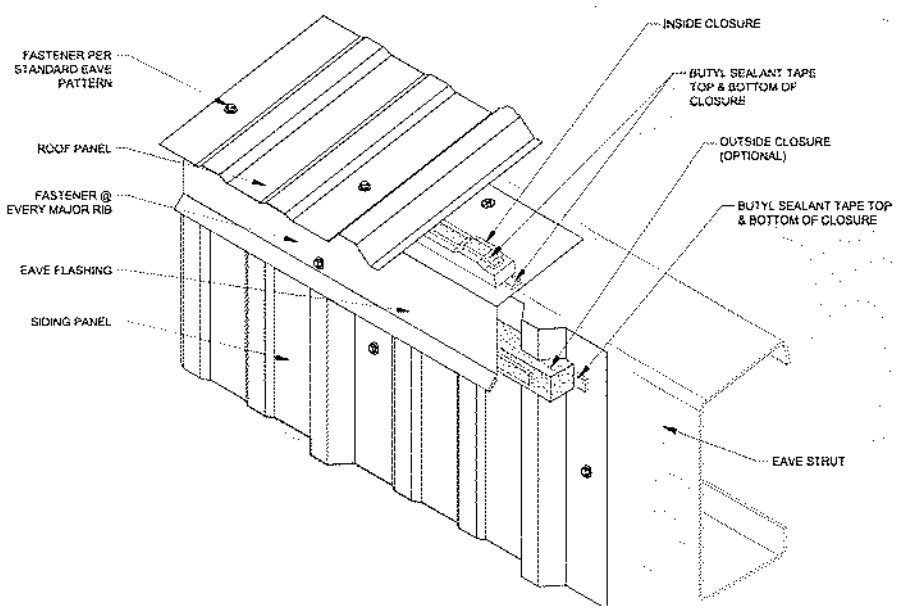
Products: Studs, Tracks, Joists, Channels

Cladding Systems- Roofs and Siding

Cladding

What is it?

An integral part of the building envelope, steel cladding products are sheet metal wall and roof assemblies formed to keep the exterior separate to the interior of a building.



Roof Cladding

Typical types of roof cladding include single skin exposed fastener, standing seam and insulated metal panel (IMP).

Wall Cladding

A wide range of panels available including Insulated Metal Panels, single skin exposed fastener and composite metal.

Resources

Roof Cladding System

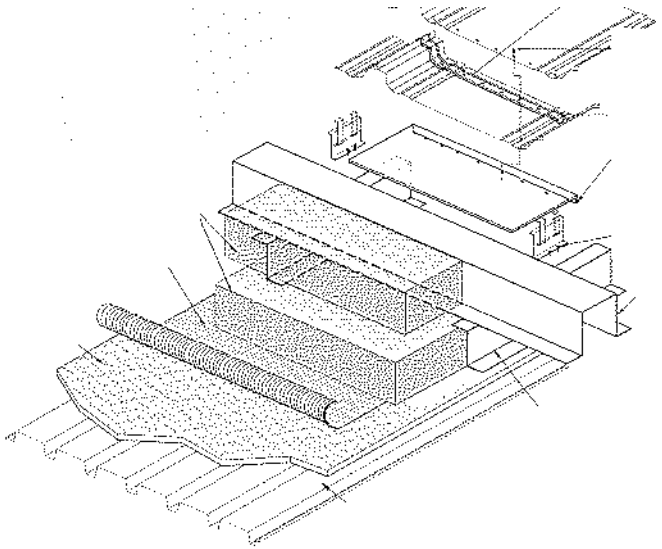
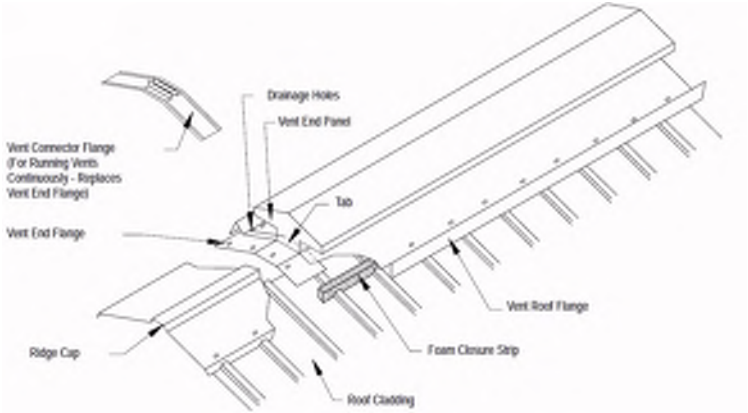


Image courtesy of Vicwest Building Products

CFS Component	Standard/Design Aid
Cladding profile	CSSBI 20M (Standard-ICI Sectors), Manufacturer load tables, CSSBI S14 (Design guide)
Clips	Tested data-Clip or cladding manufacturer
Sub Z- or C- Girts	AISI S100 (CSA S136)
Props (stiffeners)	AISI S100 (S136), Proprietary product AISI S900 Series Standards (Testing)
Fasteners	Manufacturer load tables, AISI S100 (S136), CFSEI Technical Notes F Chapter
Steel Roof Deck	



Typical Details: Roof Cladding

- CSSBI→Resources for Steel Siding & Cladding (S14)
- Manufacturer Specific Resources

Resources

Wall Cladding System

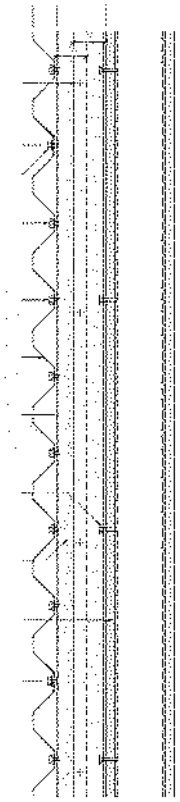
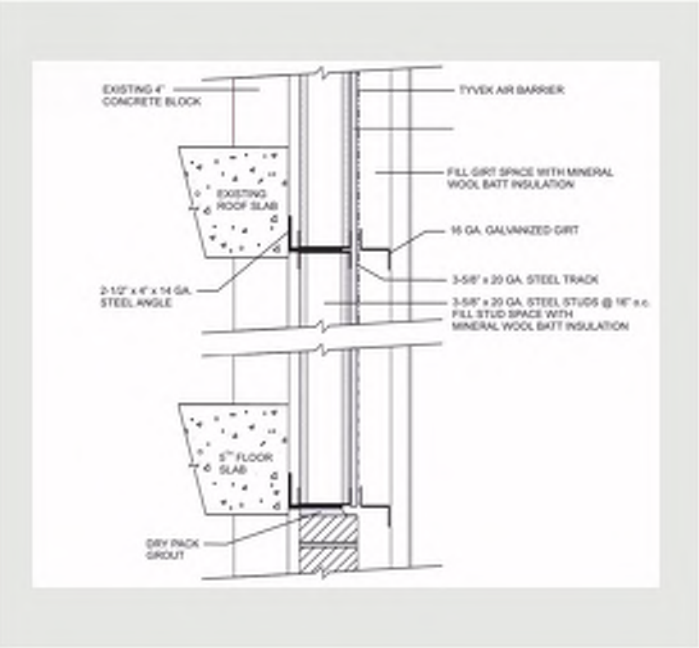


Image courtesy of Vicwest Building Products

CFS Component	Standard/Design Aid
Cladding profile	CSSBI 20M (Standard-ICI Sectors), Manufacturer load tables, CSSBI S14 (Design guide)
Clips	Tested data-Clip or cladding manufacturer
Sub Z- or C- Girts	AISI S100 (S136)
Fasteners	Manufacturer load tables, AISI S100 (S136), CFSEI Technical Notes F Chapter

Cladding Profiles

• **Design Limit States:**	• **Reference:**
Bending……	AISI S100 (S136) Section I6.1
Shear……	AISI S100 (S136) Section I6.1
Deflection……	NBCC Requirements
Web Crippling……	AISI S100 (S136) Section I6.1
Buckling Modes……	AISI S100 (S136) Section I6.1
Combination of the above……	AISI S100 (S136) Section I6.1



Typical Details:
Wall Cladding

- CSSBI→S14 and S16 Guides
- Manufacturer Resources

Steel Decks

Decking

What is it?

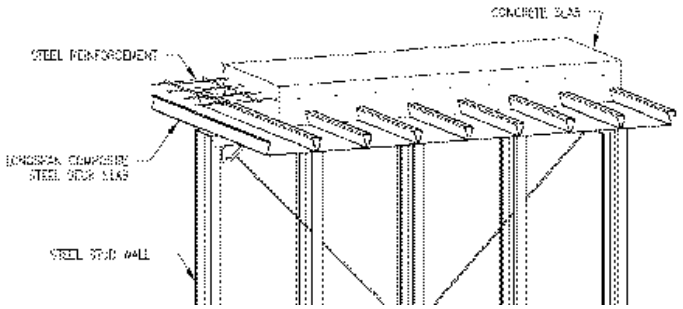
Steel decks (or metal decks) is the term used for corrugated sheet metal used as part of a floor or roof system for supporting gravitational and lateral loads. There are two primary types to decking:

Composite Floor Decks

Consists of embossed metal panels and reinforced concrete slab supported by primary or secondary framing. Can be designed as part of the shear diaphragm to transfer lateral loads.

Roof Decks

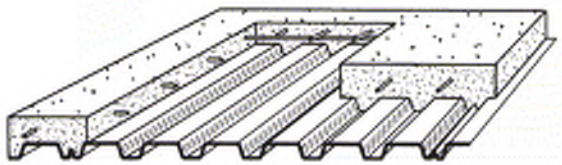
Primarily used as part of a roof cladding system to support insulation, roof cladding and environmental loads.



SDI Roof deck design guide on lsf framing, page 3-5.

Resources

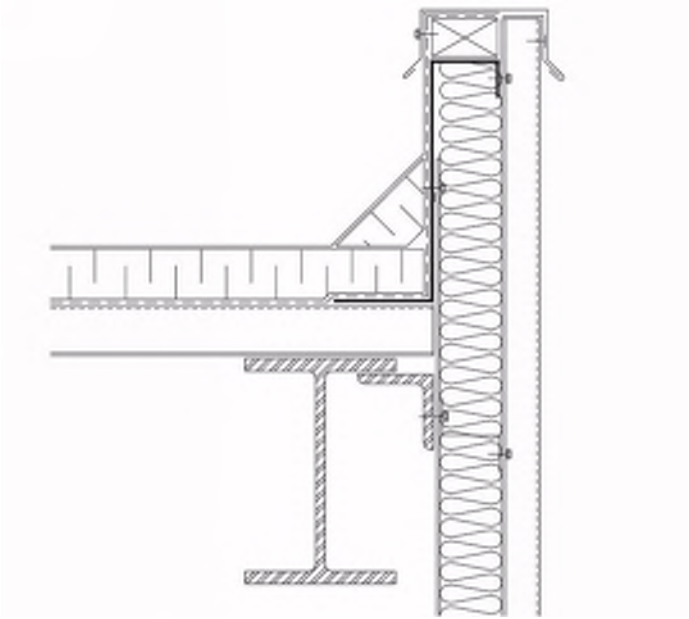
Composite Steel Deck



CFS Component	Standard/Design Aid
Steel Deck	CSSBI, SDI, AISI (Diaphragm)
Concrete	CSA A23.3
Attachments	SDI Design Manual, AISI S100 (S136), Manufacturer charts
Steel Pour Stop	Test Data, Engineering judgement, SDI Edge Form

Steel Decks
(Composite Decks)

• **Design Limit States:**	• **Reference:**
Flexure……	AISI S100 (S136)
Shear bond……	CSSBI S2 and S3
Shear diaphragm requirements….	CSSBI B13, AISI S310, SDI Design Manual
Punching shear……	CSSBI S3 Section 8
Web crippling……	AISI S100 (S136) Section G5
Deflection……	CSSBI 12M Section 7.7.2



Typical Details: Steel Decks

- CSSBI S15
- SDI
- Manufacturer resources

Upcoming Publications

CFS Version anticipated release date: Summer 2027
(Includes commentary to CSA S136-2027)

Thank You

Let's stay in touch!

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www.cisc-icca.ca

https://www.cisc-icca.ca/cssbi/