

Petersen Aluminum Corporation

AIA Provider # A022

The Art of Metal Wall Panels:  
Corrugated and Concealed  
Fastener attachments

Course Number SHT20AMW (HSW Classified)

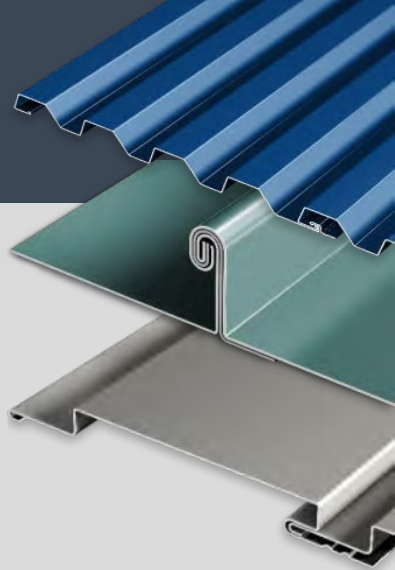


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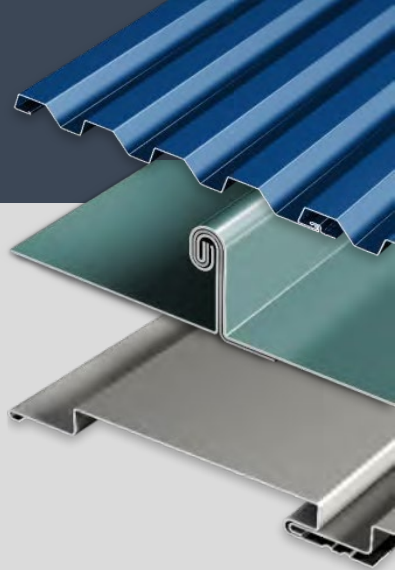


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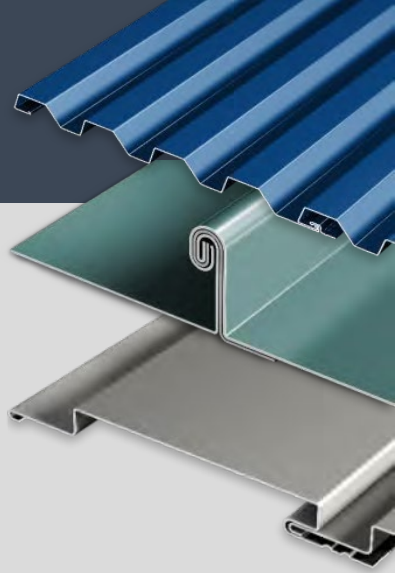


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# Course description

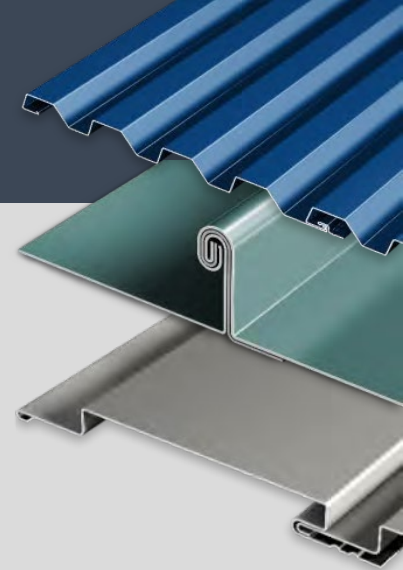
An advanced review of **metal wall panel** profiles, both exposed and concealed fastener, their proper application with field examples of flashing details “do’s and don’ts,” specific applications of these wall panel products and how they affect environmental efficiency, project sustainability and product performance.





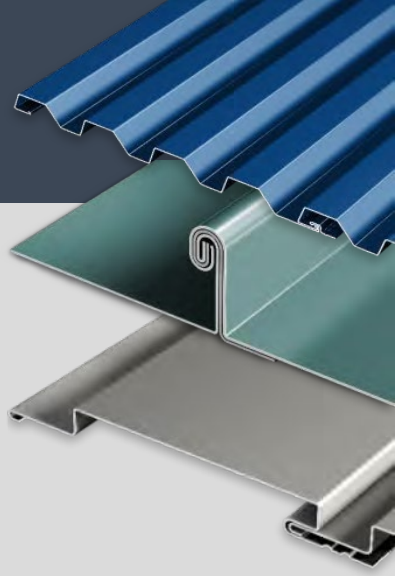
# Learning objectives

1. Identify **critical performance requirements and potential problem areas during the DD and CD stages**
2. Examine the importance of **incorporating the structural engineer-of-record wind loads with cladding and component negative loads early in the DD phase**
3. Examine basic metal wall panel and **sheet metal field flashing details and conditions (layouts) to design the proper installation of these flashing details during DD**
4. Understand the importance of **key basic details and layout of these field flashing details** to provide the owner the desired watertight and aesthetically attractive completed metal wall panel system



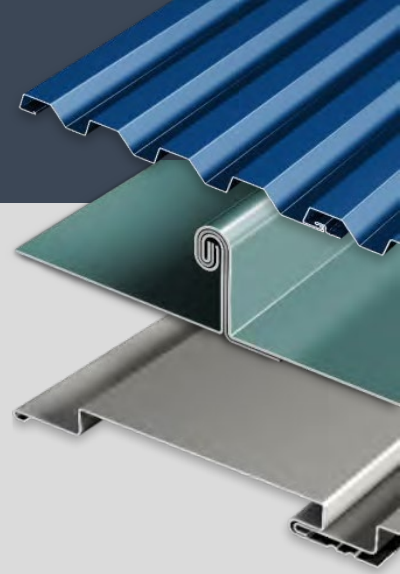
# Overview

- Review of wall elevations and conditions during DD and CD stage.
- Apply S Notes from structural engineer of record prior to starting specification of wall panel system.
- Inspect basic framing issues PRIOR to installation.
- Layout of wall panels and flashings: ask questions.
- Identify early any problem areas: interface with other trades and wall penetrations.
- Identify “what else”



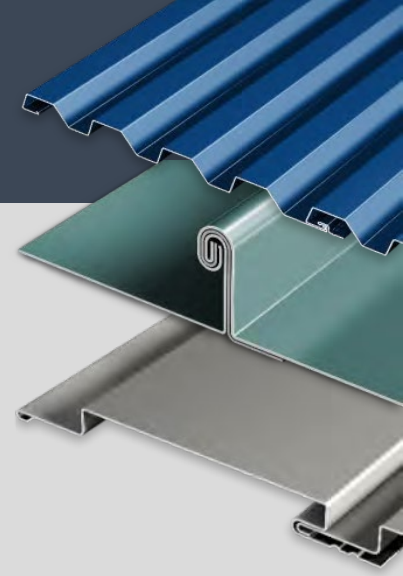
# Design stage decisions gone wrong

**Guantánamo Bay: coastal application designed with steel. Replaced with aluminum within 10 years**



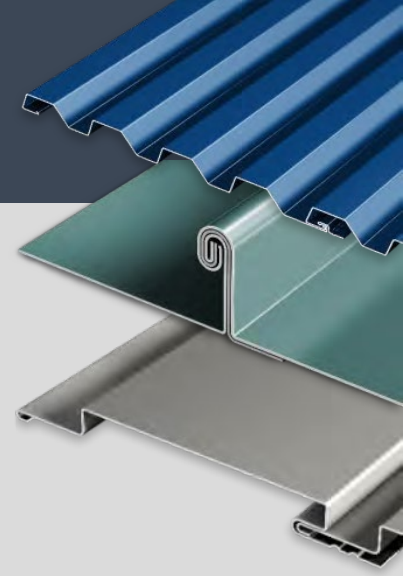
# Field-applied finishes

Not only is this steel substrate on the coast, but field-applied (paint) finish does not perform the same as factory-applied





# Where do we begin?

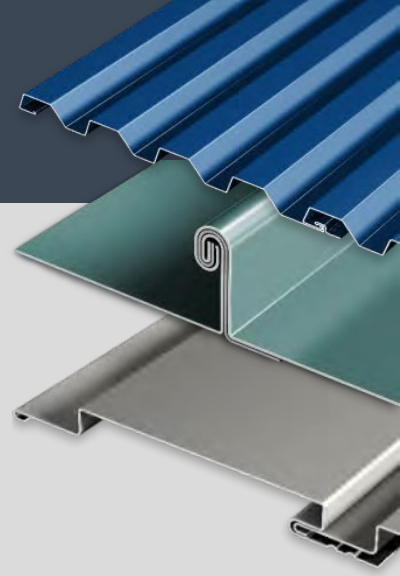


1. Hat channel too far apart

2. Wrong size hat channel face, resulting in clip not properly fastened in both spots

P.S. Not all mechanicals have been installed, so final panel installation is on “Hold”

# Oil canning is NOT a cause for rejection



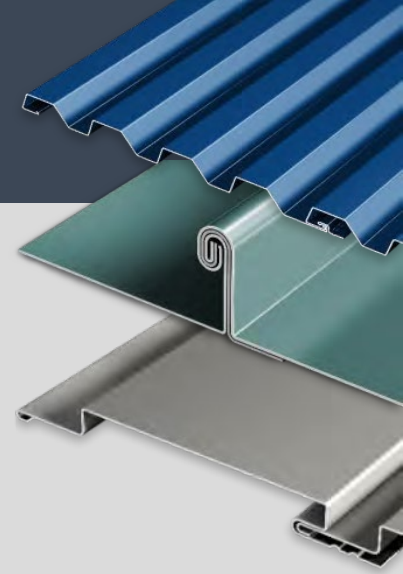


# Seek advice from the experts ... early

Panel at or exceeded recommended length, resulting in **oil canning**

→ Design flashing breaks to shorten panels

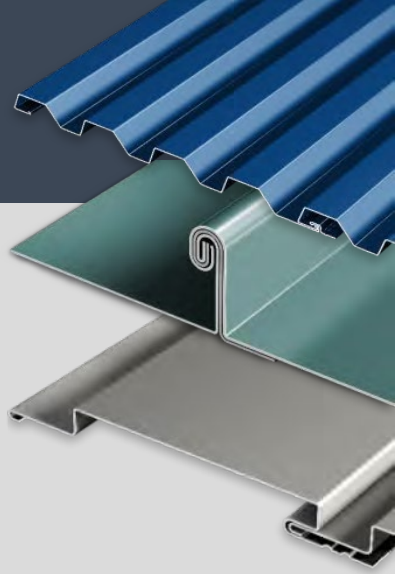
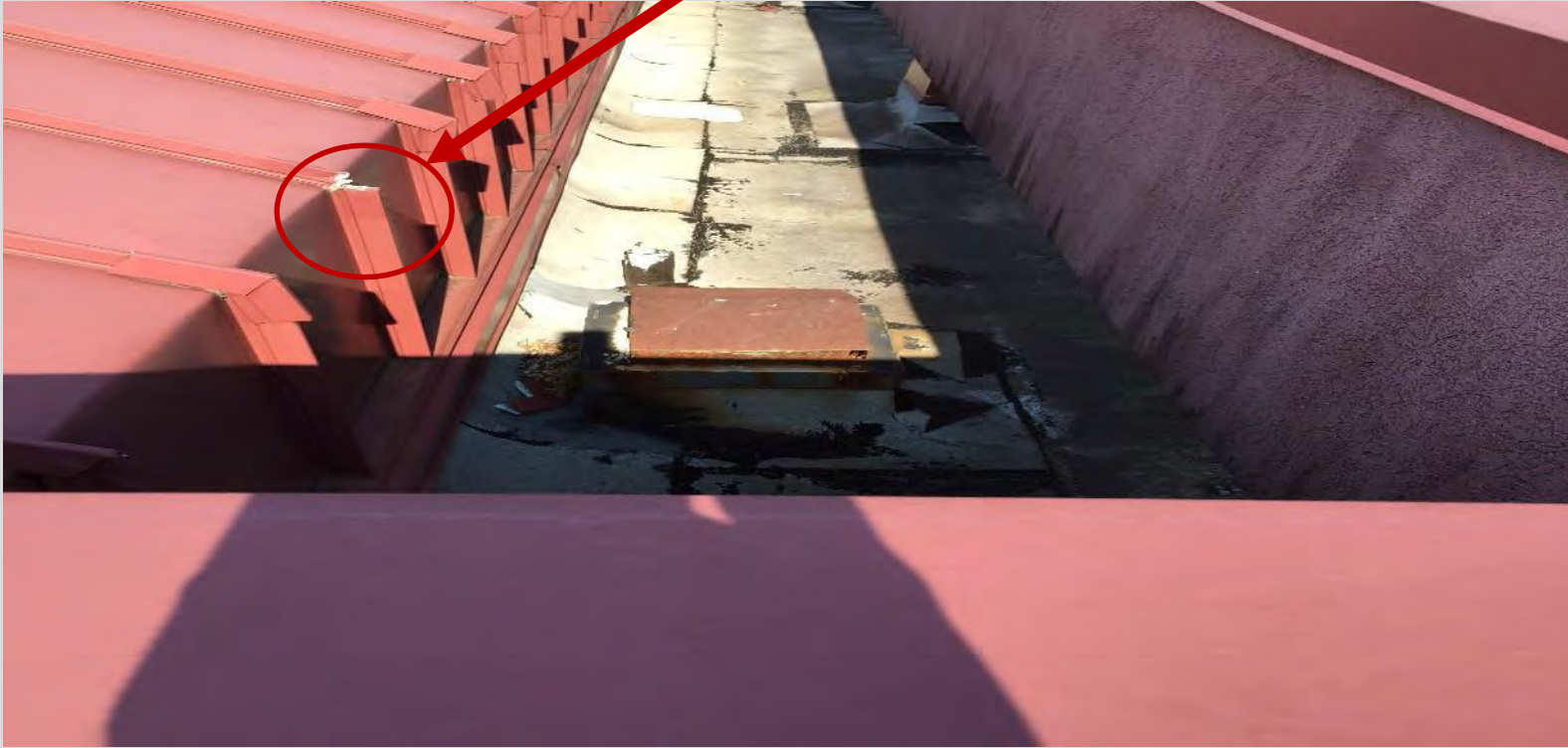
→ Increase gauge and add panel conditions (i.e. pencil ribs)





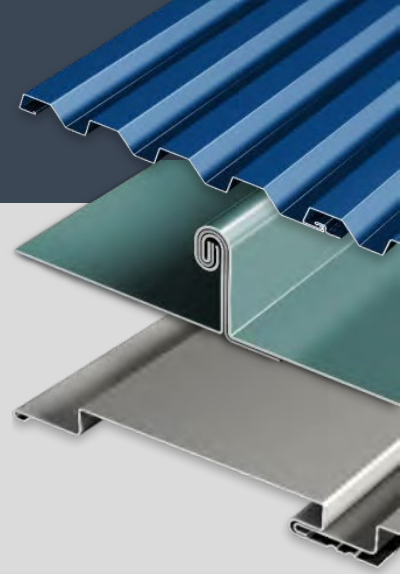
# Updated details

Avoid relying on sealants (the “old” details) and consult your panel manufacturer early in the design phase (missing knuckles)



# But some things are out of your control

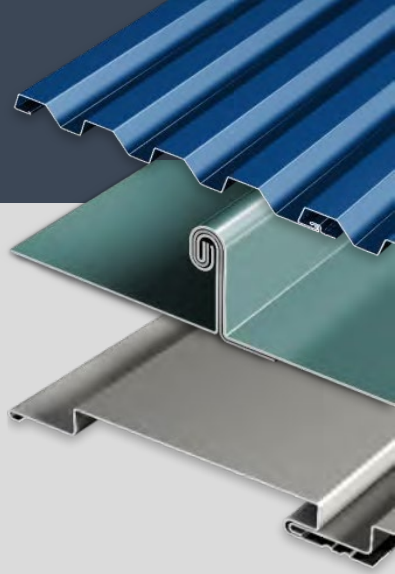
DMV entrance: inexperienced drivers pull up to the front.  
Unable to design for every human factor.



# Learning objective 1

Identify **critical performance requirements** and **key criteria** that are important to the owner during the DD and CD stages.

**Contact** the manufacturer and an expert contractor early.

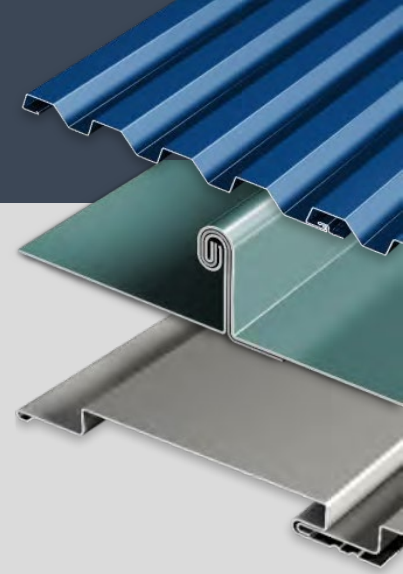


# Decisions made early in design

Assess the big picture: coastal application or high wind area, use (such as high traffic), feature elevation (signage)

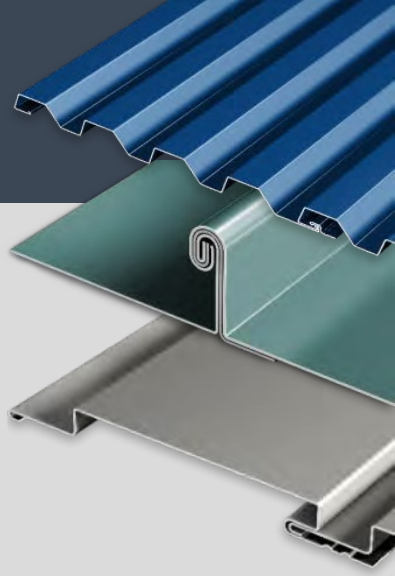
Consider performance requirements, such as:

- Building height and other performance criteria
- Material: single skin, composite panels, insulated
- Aluminum vs. steel
- Maximum panel length – they all have limitations
- Trade integration and collaboration (i.e. mechanical or plumbing with cladding sub-contractor)



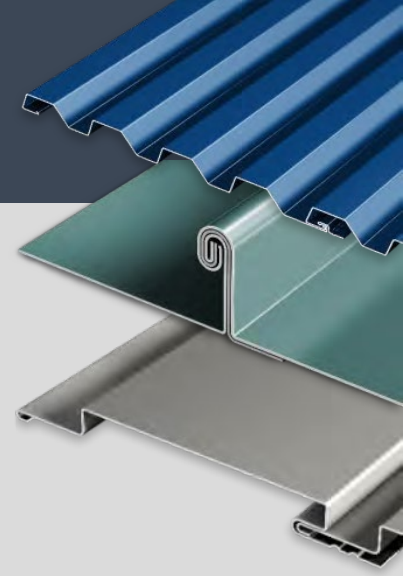
# Identifying potential issues early

- Where is my building **located** and am I specifying the **correct metal substrate** for this location?
  - **Aluminum** is required for any coastal, salt water or otherwise corrosive or aggressive environments.
  - Corrosive environments require all **attachment components** to be **stainless steel or aluminum**, including clips, screws, cleats, flashings





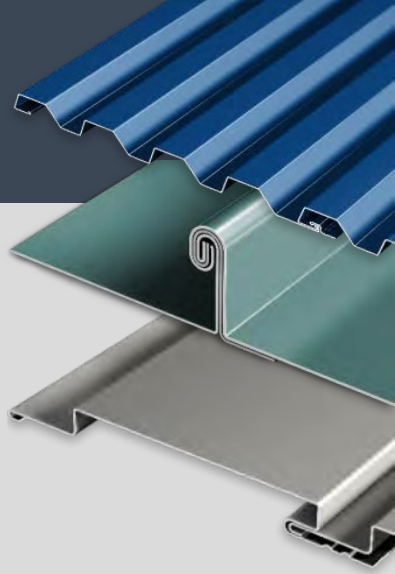
# Identify issues in DD and CD stages



- Does my **budget** for this wall fit/meet the client's expectation for this elevation?
  - How **visible** will this wall be in the overall elevation of the finished building?
  - Is this wall area or entire wall **important** to the client?
- Does the wall assembly on each elevation have **suitable framing and sub-structure for a metal panel** attachment?

# Identifying potential issues early

- Is there a significant number of wall penetrations on this building? If so, are metal wall panels the right cladding?
- Have we discussed the BUDGET of this wall cladding with the owner? Can we afford the cost of the wall cladding that we currently have in mind?

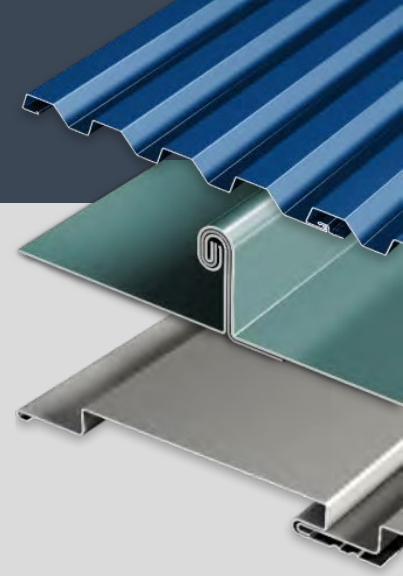




# Successful project profile



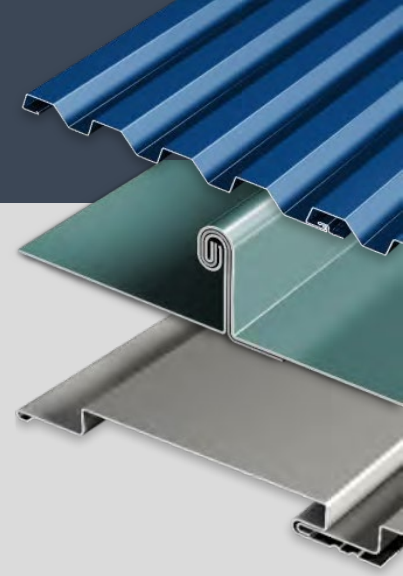
Before and after



- Proper framing and attachment
  - Horizontal and vertical
  - Zee channel for insulation
- Intentional panel breaks



# Project profile

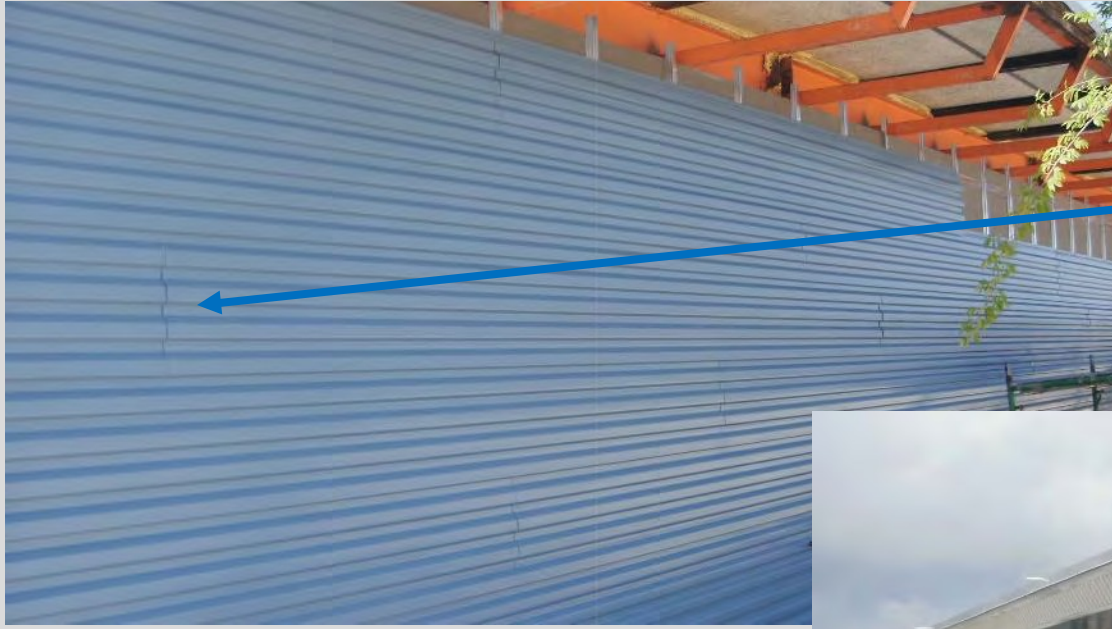


Adequate attachment spacing  
because **wind load requirements**  
**determined up front by structural**  
**engineer**

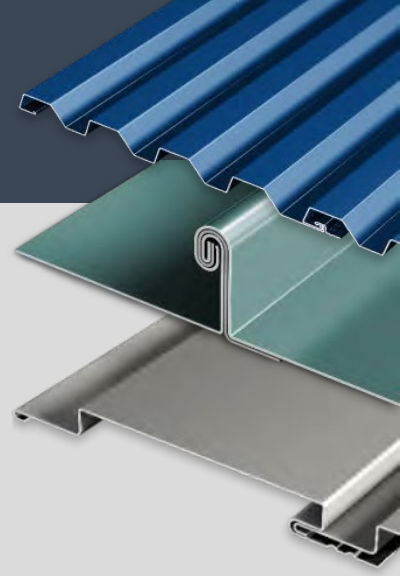




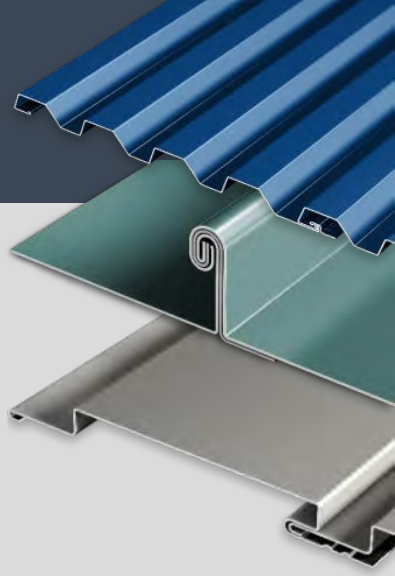
# Project profile



Different panel splice details determined prior to construction phase.



# Project profile: Asheville, NC



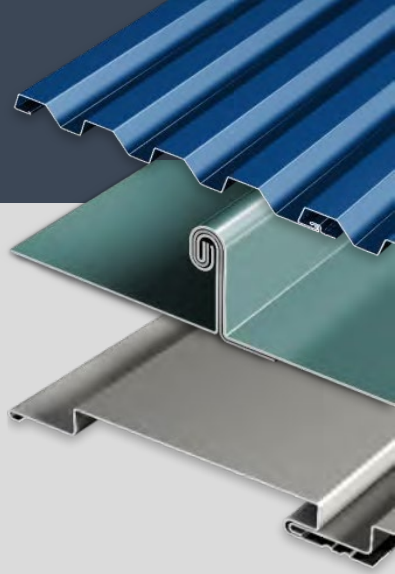
Three different profiles on wall, monitor roofing, and monitor walls

- Suitable for each application
- Economical (labor)
- Visually interesting

## Learning objective 2

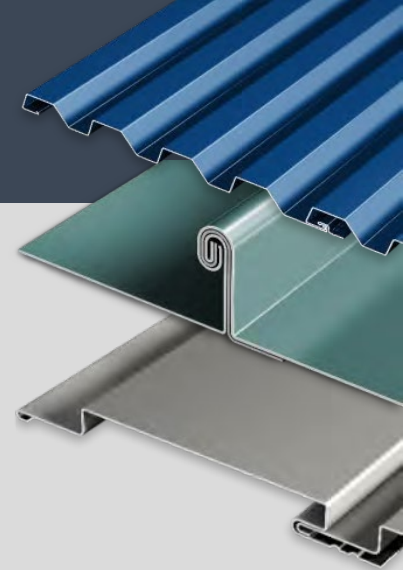
Structural engineer-of-record **MUST BE** brought into the equation much earlier than in past years.

- S-E-O-R should provide the cladding and component negative loads for the roof and walls.
- Ensure that you have the **correct loads (by zone)** for the building from which to start your design and specification for the roof and the walls.



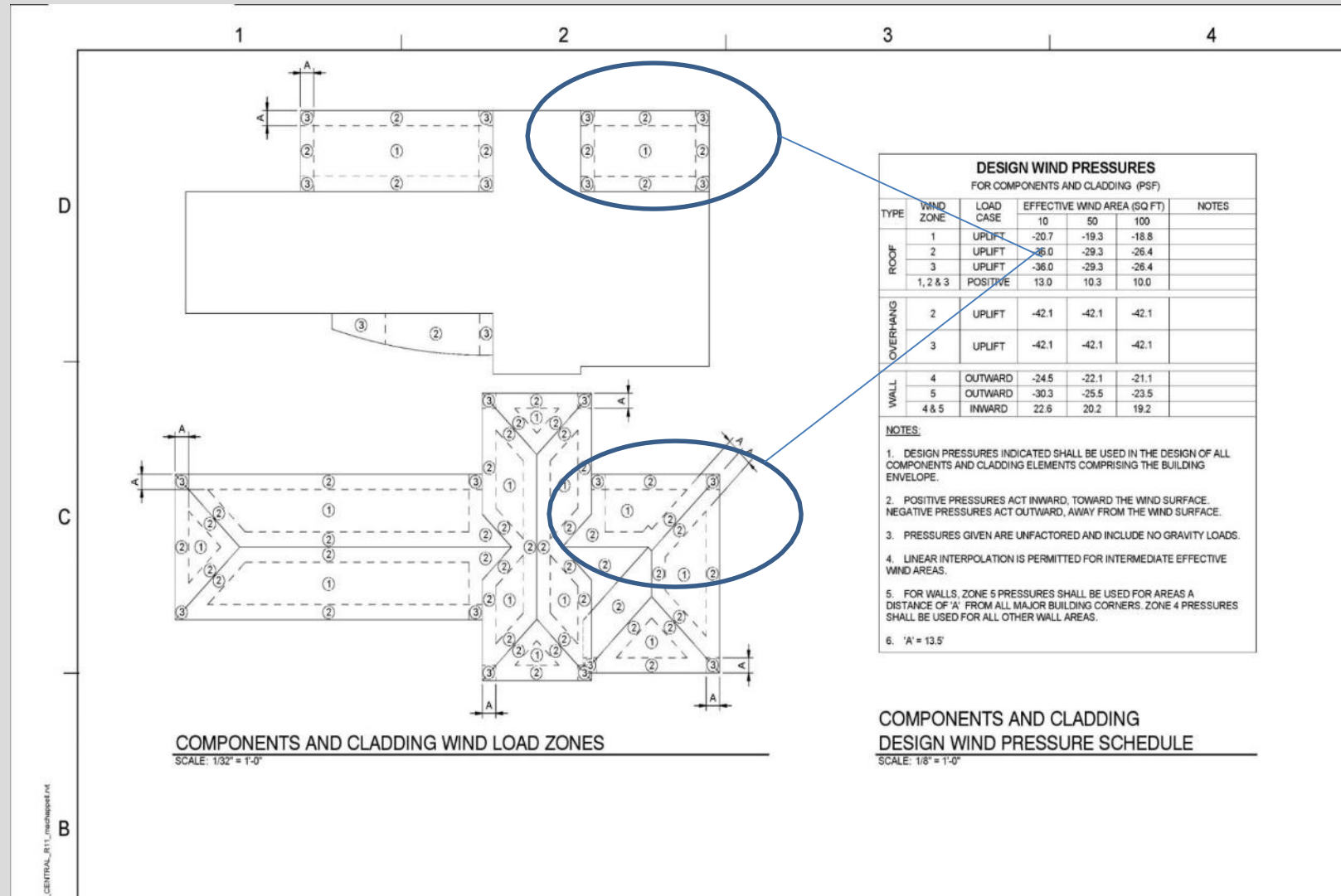


# Example of cladding loads



Tables based upon ASCE 10, but ASCE 16 coming soon.

ASCE-16 changes the “rule of thumb” to specific perimeter and corner zones BY elevation (e.g. prevailing winds, openings, etc.)

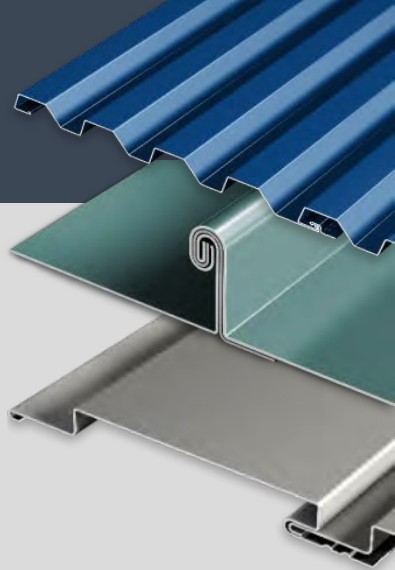
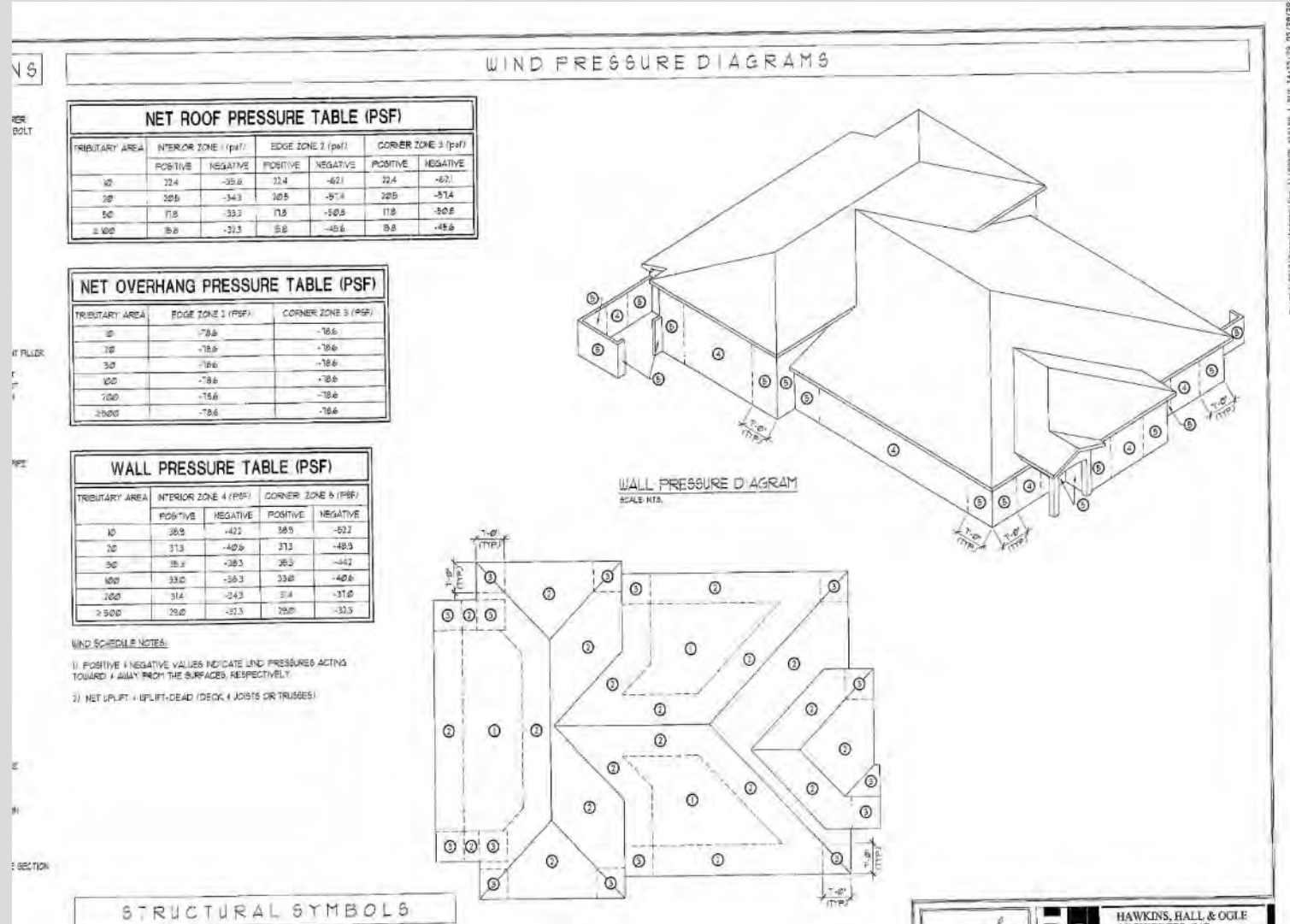


## A close-up photograph showing three different styles of metal roofing panels. The top panel is blue with a corrugated (ribbed) profile. The middle panel is green with a standing seam profile, featuring a visible vertical seam. The bottom panel is silver with a ribbed profile, similar to the blue one but with a different finish. The panels are arranged in a slightly overlapping, diagonal fashion against a plain white background.





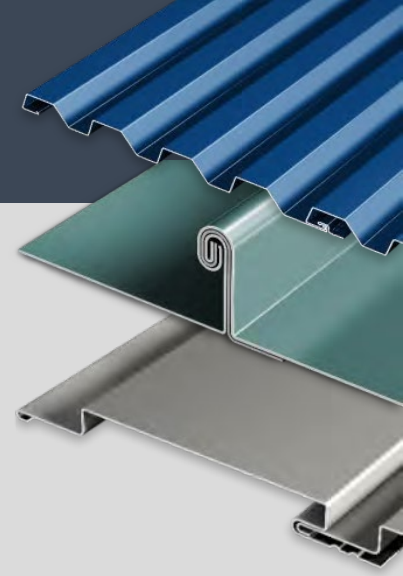
# Example of cladding loads (3)



# Enhanced attachment in specific building zone



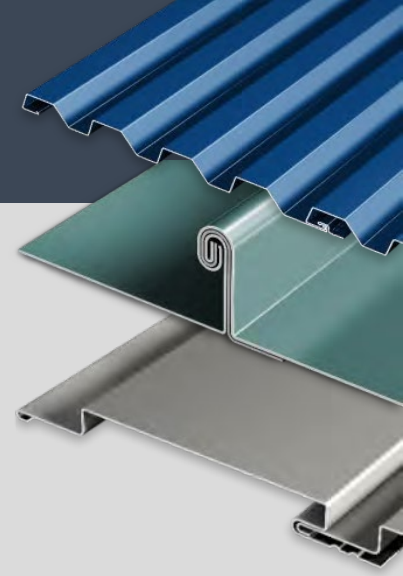
Panel loads: use  
**2.0 Safety Factor (PSF)**



Note the additional framing for the soffit panels



# Panel installed



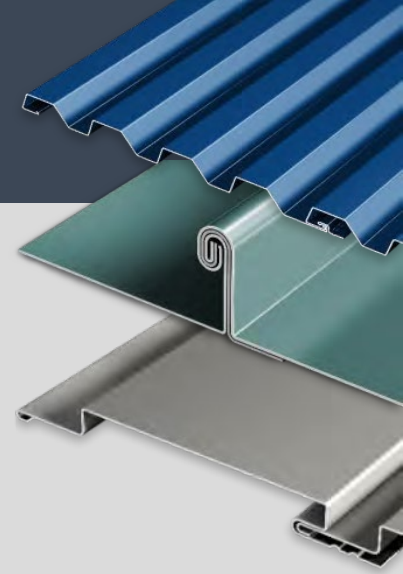


# Horizontal wall panel installation



## During construction

- Zee channels installed perpendicular to panel
- Foil-faced insulation

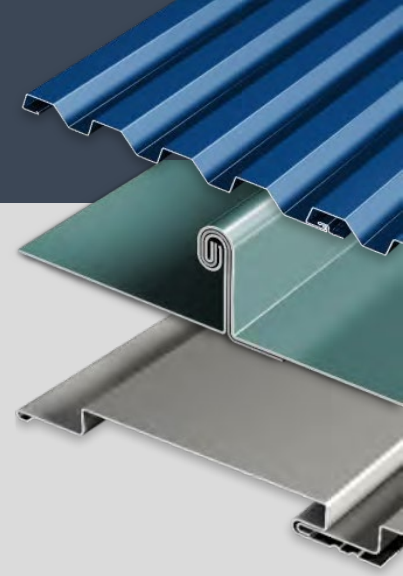


## Completed installation

- Architect edict was no flashing breaks
- Elevation exceeded maximum panel length
- Selected a wall panel that allowed for panel splice/overlap (as opposed to flashing breaks)



# Horizontal wall panel installation



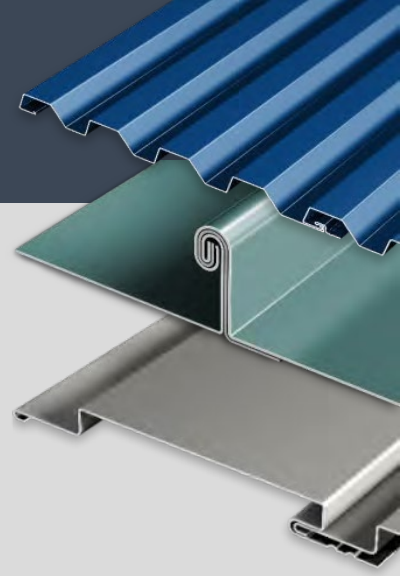
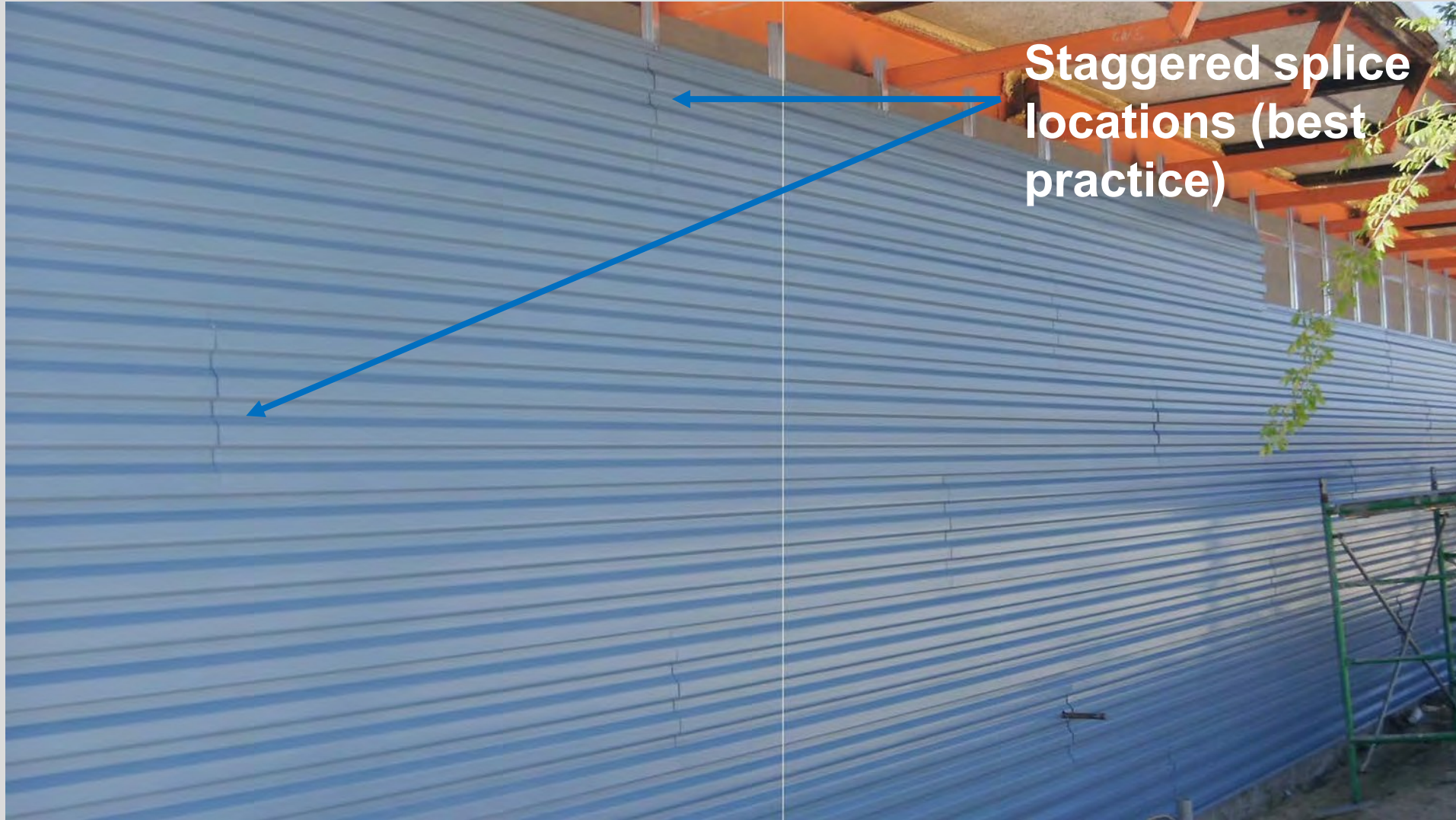
Proper orientation of zee channels for horizontal wall installation

Pre-determined flashing breaks incorporated into design



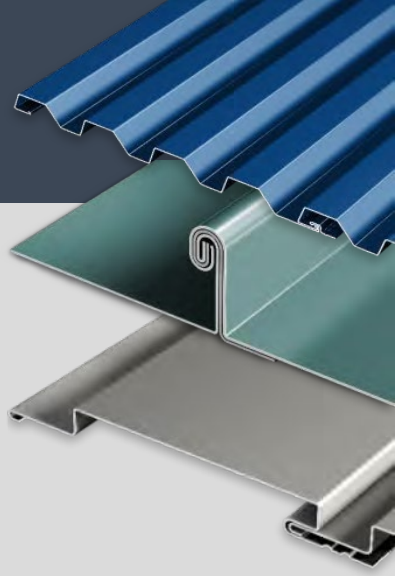


# Horizontal wall panel installation



# Learning objective 3

- “If something doesn’t look right, it probably isn’t.”
  - Investigate and find out why, then direct this to be corrected.
- Examine basic framing issues.
- Examine basic metal wall panel flashing conditions in the field and recognize the proper installation of these details.

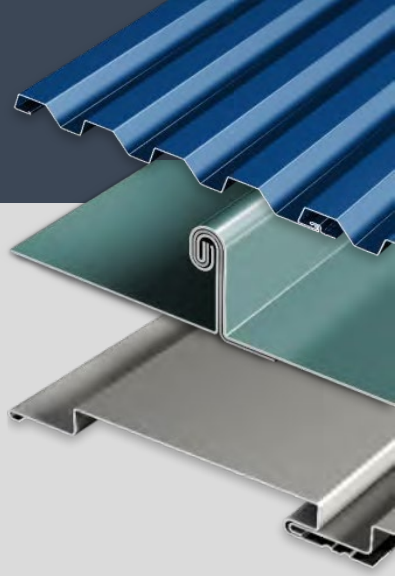




# Inspection of jobsite details



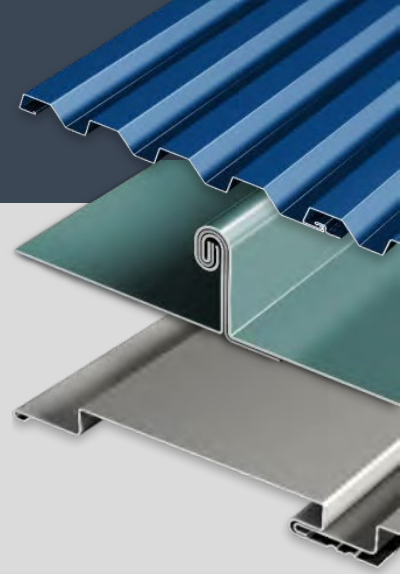
The roof cladding  
will reflect the deck



# Result of jobsite details NOT inspected



- Uneven substrate
- Clips too tight
- No expansion for longer-length panels

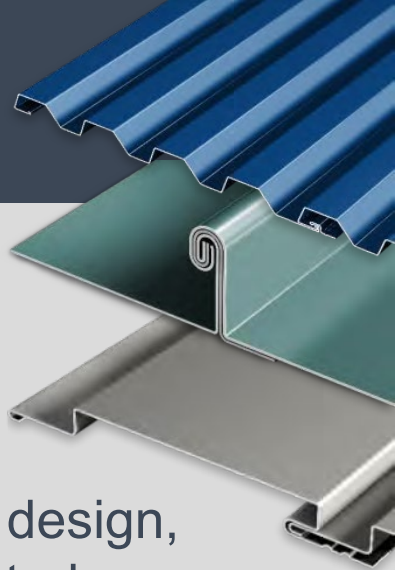


# Unsightly jobsite details



Extensive flashing detail design,  
followed by poorly executed  
penetration details

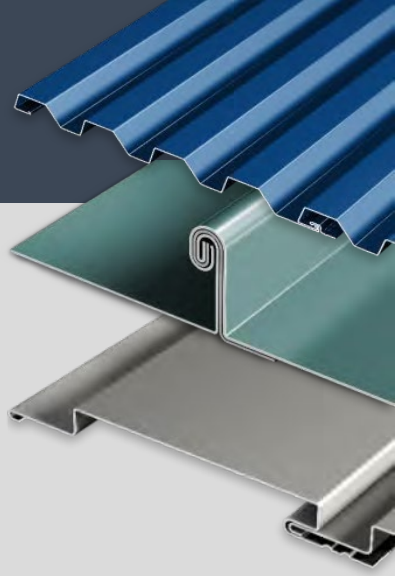
- **Dissimilar metals** (copper) draining onto wall panel will erode finish
- Suggest **flashing around the cluster** of pipes





# Inspection of project details before panel installation

Trade collaboration during construction  
(before panels were installed)



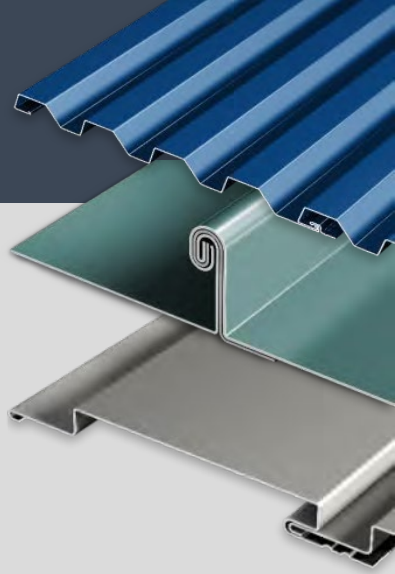


# Temporary details during installation

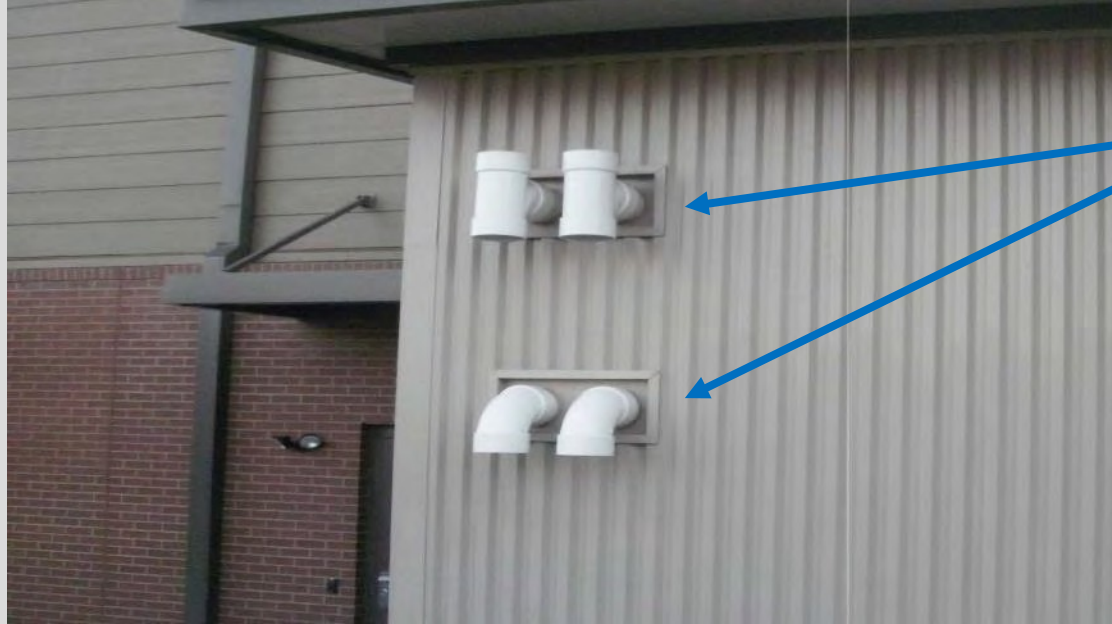
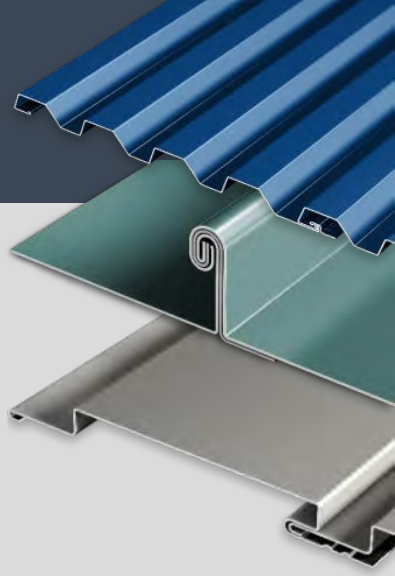


During construction

- Intermediate pipes are temporarily caulked



# Final details – completed installation

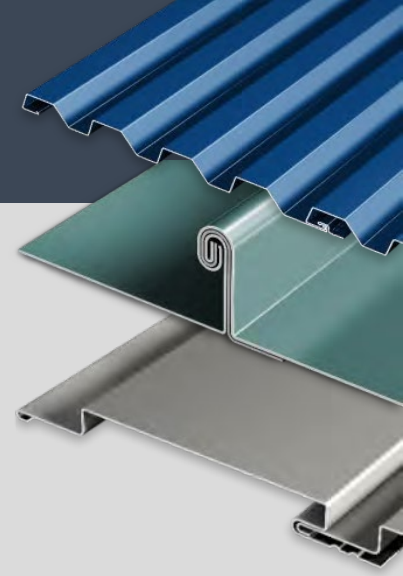


Flashing details  
should look like this



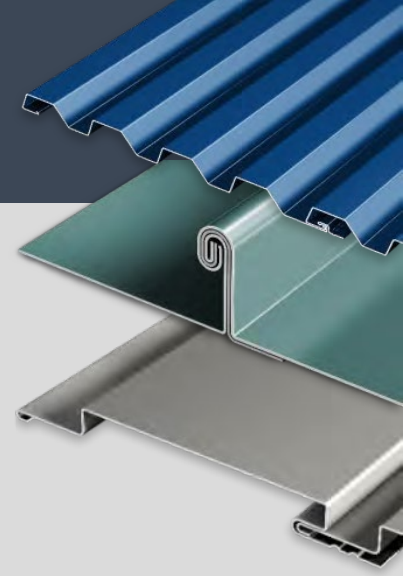
Clean, neat and weathertight  
flashing details on penetrations

# Clean details: louvers, flashings, soffit

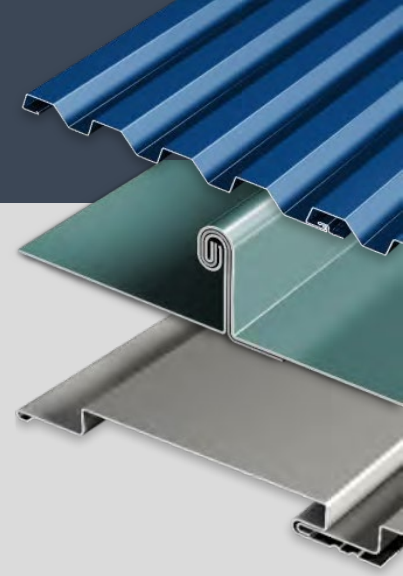




# Profile project: retrofit metal building



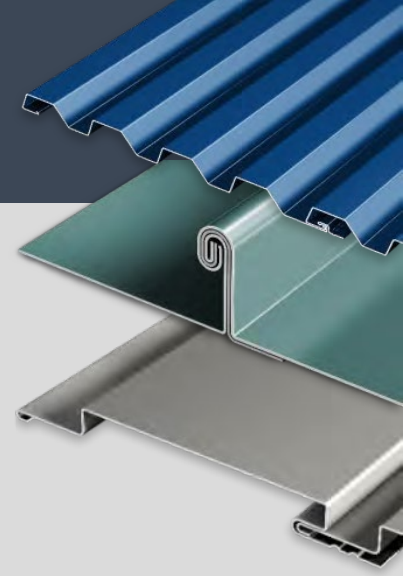
# Project profile



- .032 aluminum to endure scratched paint from a thrown tennis racket!
- Economical aesthetic enhancement
  - 7/8" Corrugated
  - Plywood stud wall
  - Fluid-applied weather barrier



# Project profile 2



Adjacent panel splice details  
placed behind downspouts

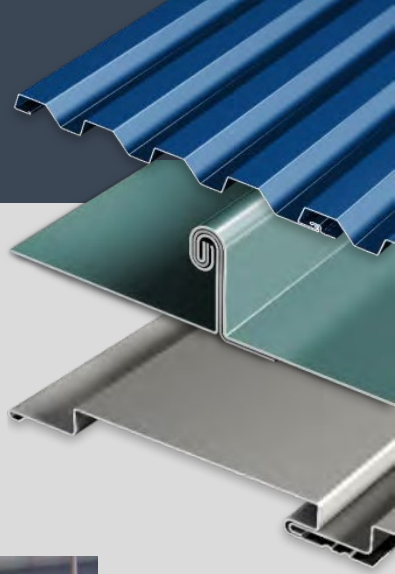


# Project profile 3

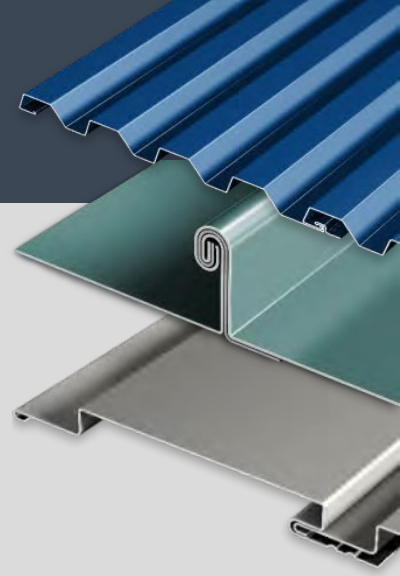
Jacksonville, Fla., Humane Society



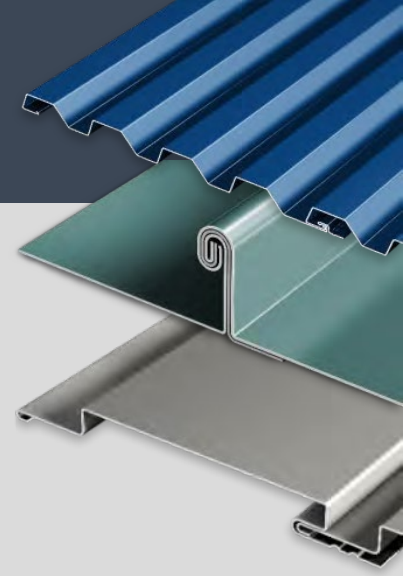
- Horizontal panels continued into interior



# Clean flashing details



## Learning objective 4

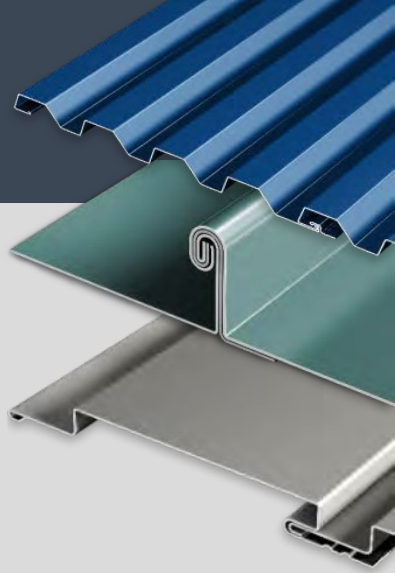


Understand the importance of **key basic details and layout of these field flashing details** to provide the owner the desired watertight and aesthetically attractive completed metal wall panel system.



# Learning objective 4

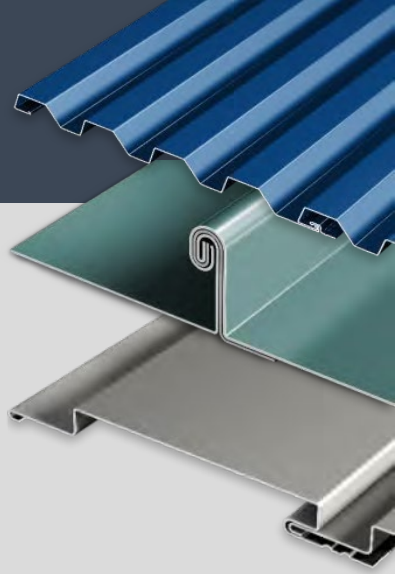
- Tie all these basic details together with this simple summary:
  - “Do I have positive drainage flow of all water that hits my wall cladding?”
- Look at additional items that can be placed sparingly on the walls:
  - Lights, louvers, vents, signage or similar and remind your owner, “how will this be maintained?”
- Remember: a metal panel wall system is 100% RECYCLABLE at the end of its lifecycle and will easily last 20 years and longer with simple care and maintenance.



# Effects of late-addition details



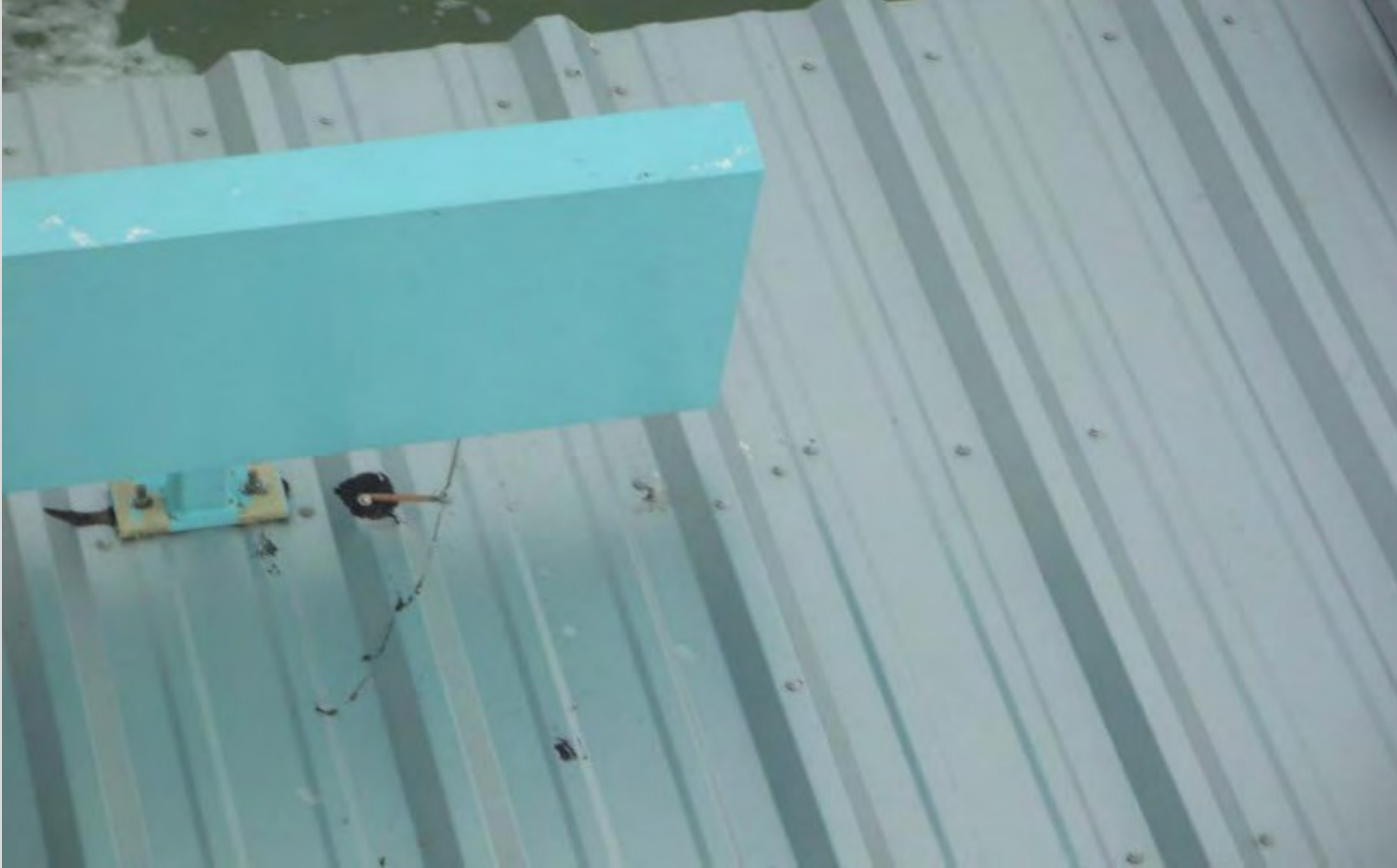
Upon project completion



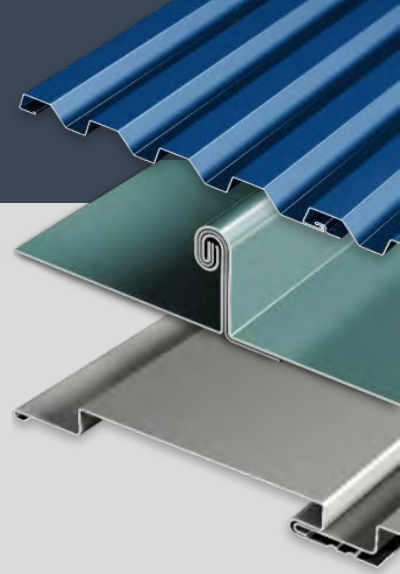
One Year Later:  
Neon signs added



# Effects of late-addition details

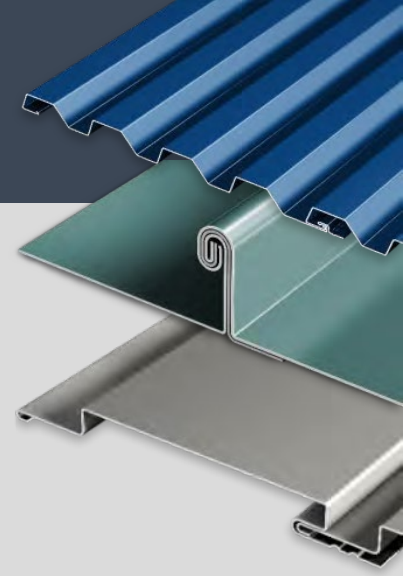


- Fastened through panel
- Relies on caulk for water-tightness
- Copper ground or other wire touching aluminum panel





Signage does not have to be an after thought

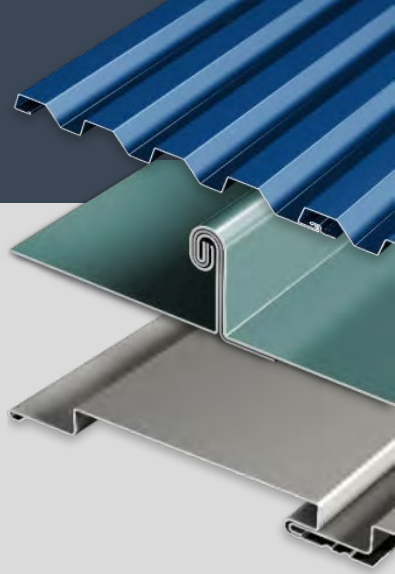


# Well-intentioned details



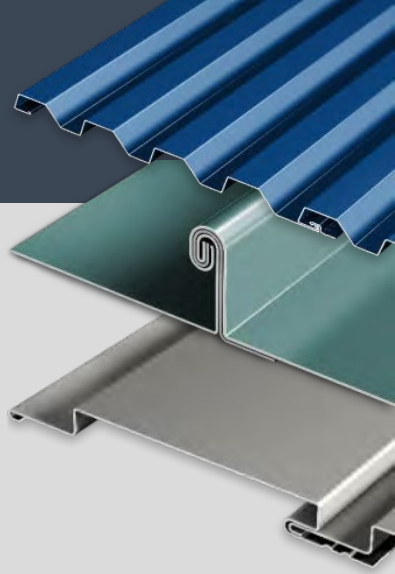
- 80-year-old structure with new cladding
- Weight of new stone copings still had to meet building code
- Wall supports were added during the retrofit design

## UNC Dental School





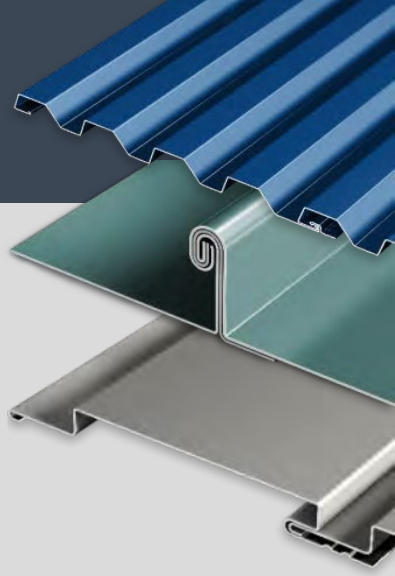
# Well-intentioned details



Metal canopies provide shade while tying into the accentuating wall panels



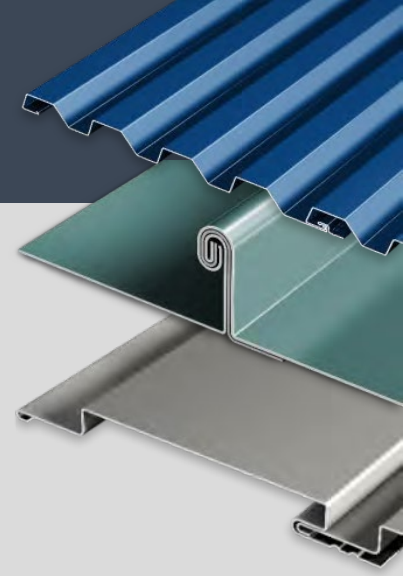
# Project profile at Georgia Southern University



Same panel profile

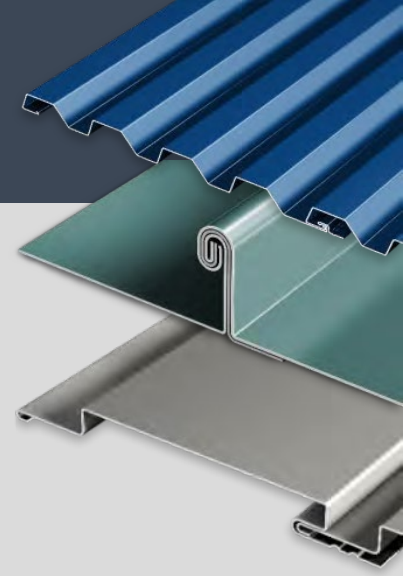
- Standard installation
- Same profile - reverse run

# Project profile – same project, different elevation





# Perforation panel: holes NEVER line up

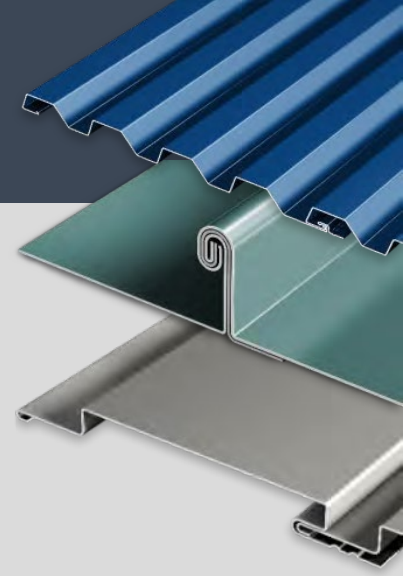


Note the side laps as well as the end laps are visible (look solid)



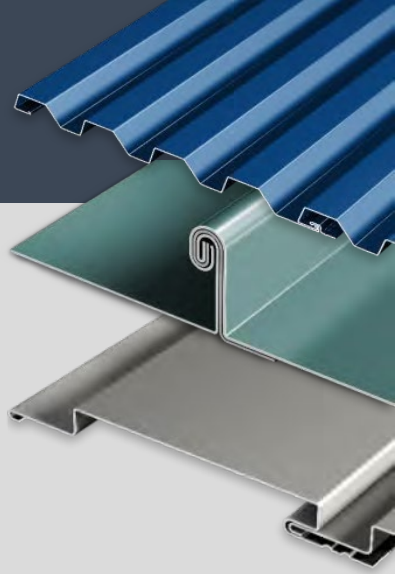


# Perforation project



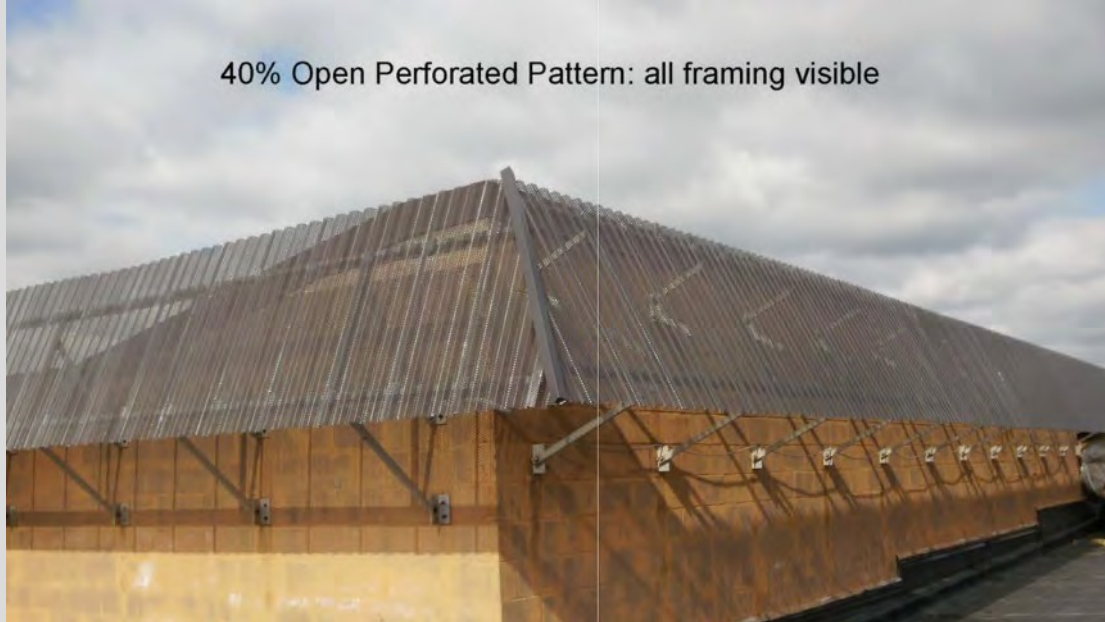
- Perforated .040
- No end or side laps
- Suspended to structural framing (not structurally attached)
- Sound deadening

# Well-intentioned details





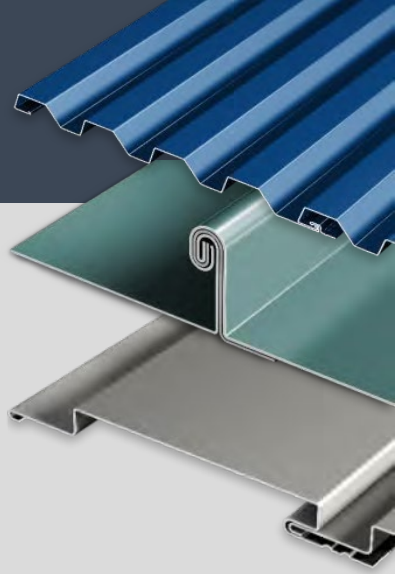
# Well-intentioned details



Panel length was determined  
by visibility from ground

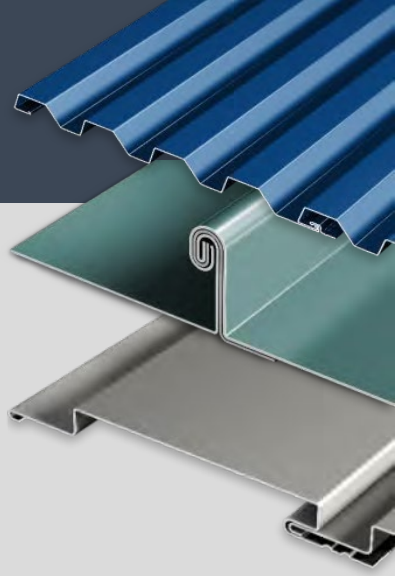


Panels retrofitted to hide  
outdated mechanical screen wall

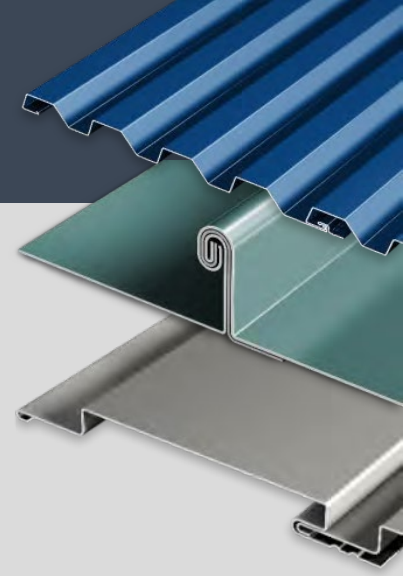




# Project profile: sun shade



# Project profile: equipment screen

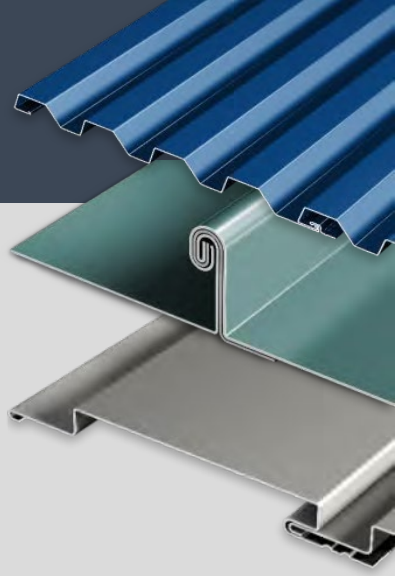




# Project profile: parking garage



International Drive, Orlando



- Perforated screen wall (aesthetic)
- 51% air space (large hole)

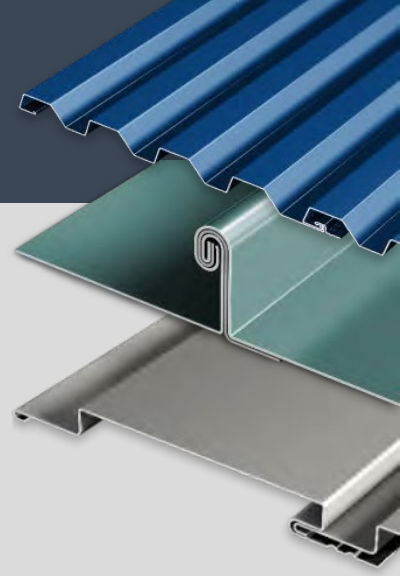




# Metal is 100% recyclable



Even the alloys are separated!



This concludes the American Institute of Architects  
Continuing Education Systems course

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