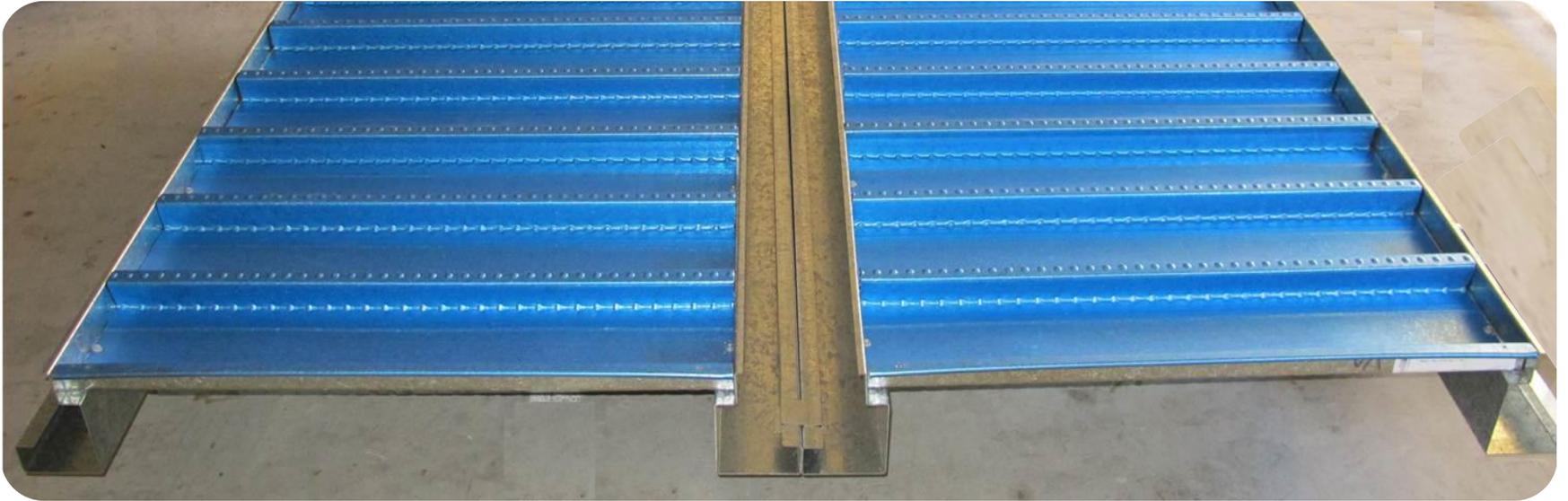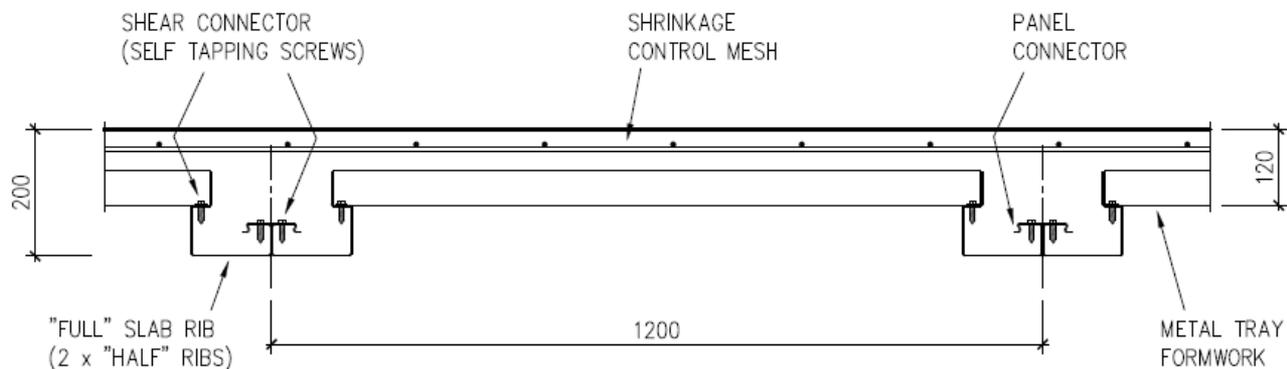# ESLAB

Composite Panel Flooring System

NEXT GENERATION SLAB DESIGN
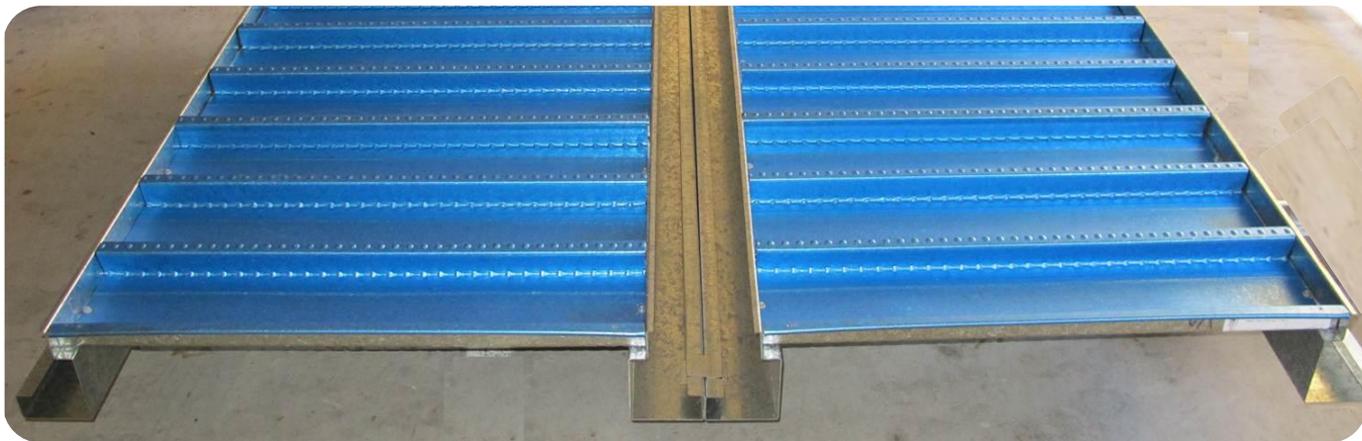
System Overview

ESLAB

- Ribbed slab profiles offer the most efficient structural floor designs

- Steel and concrete are 100% utilised where they are needed

- Steel and concrete are deleted, or minimised, where they are not needed

- Eslab is comprised of components readily available in the industry

- Eslab technology is a world first in composite detail and design

- Unique 2-Way cold rolled design efficiently harnesses full composite action

ESLAB

- Quick slab designs possible with Eslab's proprietary design software

- High shear capacity via the steel ribs makes Eslab suitable for high load designs

- Post tensioning can be placed within ribs for transfer loads, or very long spans

- Extremely light to transport compared with precast

- A market leading installation rate is possible

- Complete "Wall and Floor Solution" when teamed with a structural walling system

Key System Components

ESLAB Panel Section

1. SHEAR CONNECTOR (SELF TAPPING SCREWS)

IN-SITU CONCRETE

SHRINKAGE CONTROL MESH

2. PANEL CONNECTOR

200

120

3. "FULL" SLAB RIB (2 x "HALF" RIBS)

1200

4. METAL TRAY FORMWORK
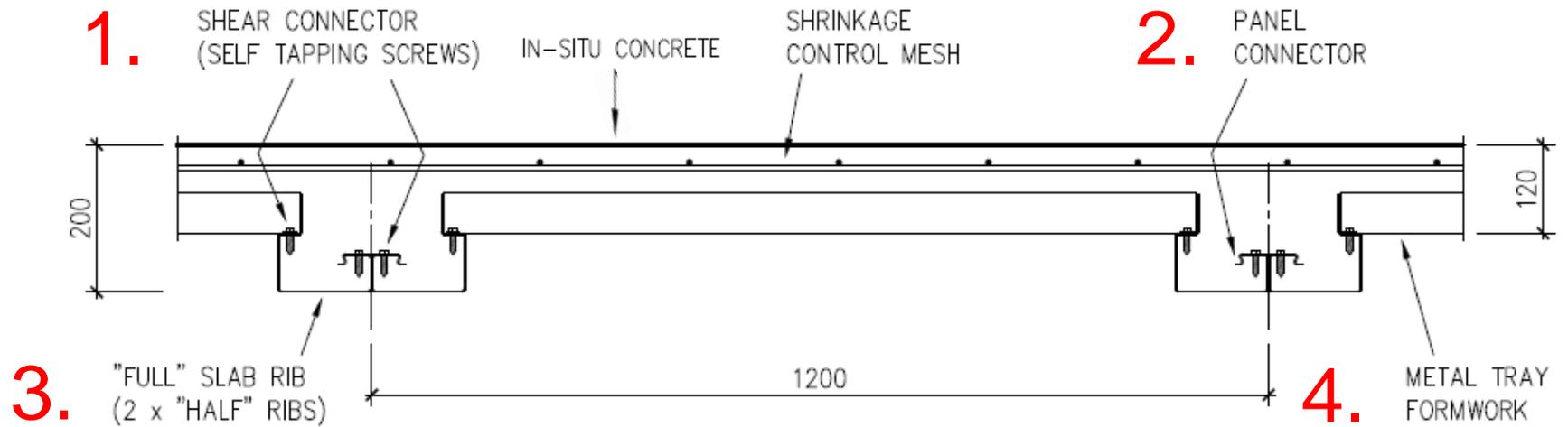
1. Engineered shear connectors

- Standard self tapping screws

- Engineered connection creates composite action between concrete, metal infill and ribs

- Key system innovation
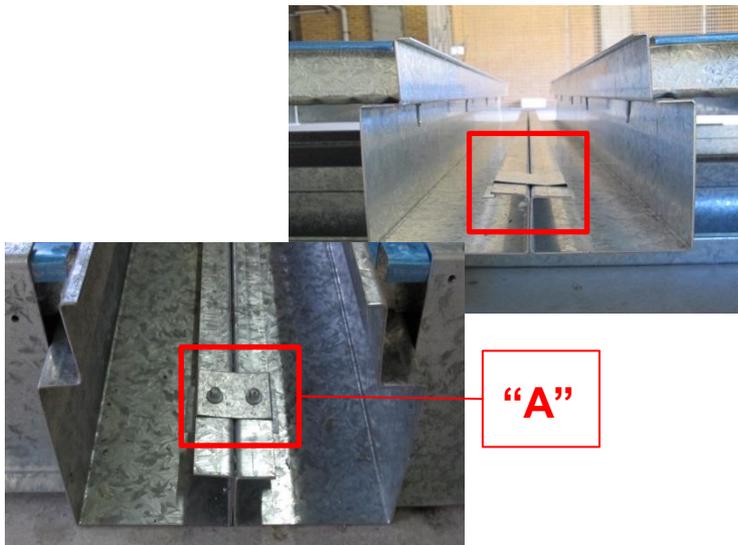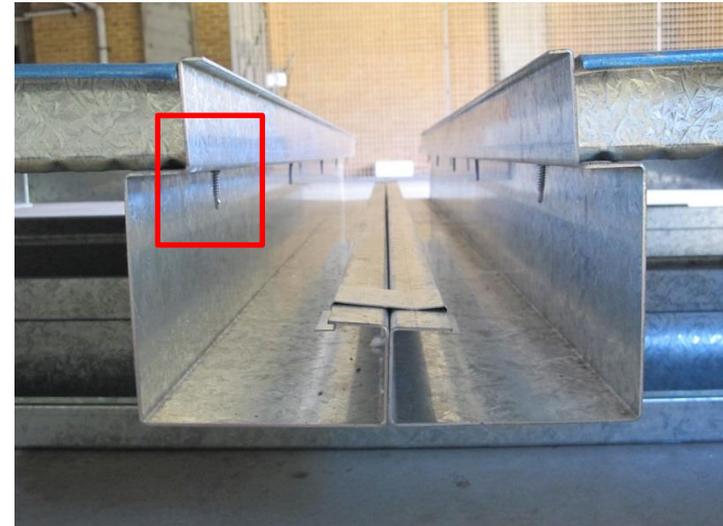
2. Proprietary "snap on" panel connectors

"A"

- Folded steel clips installed along length of rib

- Ties ribs together to avoid panel movement during concrete pour ("A" end clips screwed to rib)

- Quick, safe and easy to install

View connector installation video >

3. Proprietary Slab Ribs

- 1.9-2.4mm "Galvaspan" coil sheet

- Based on Australian standards

- Coil widths match standard purlins

- Key system innovation
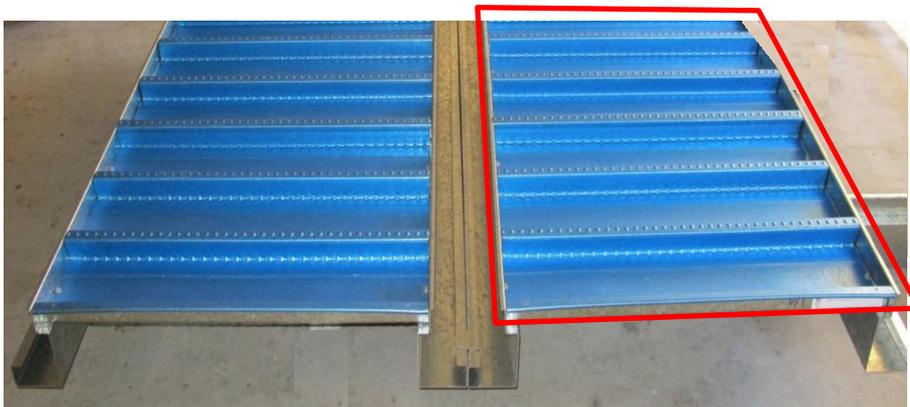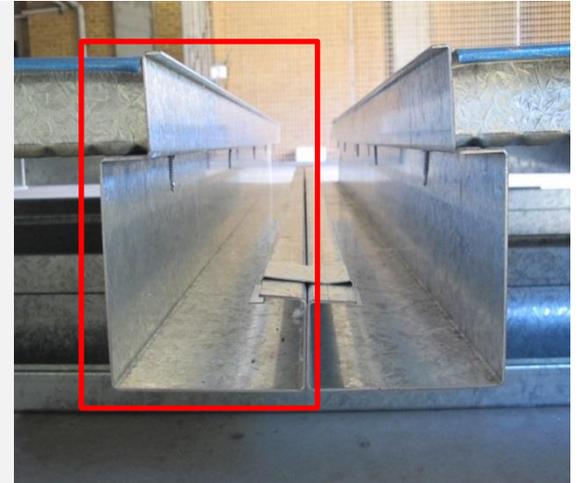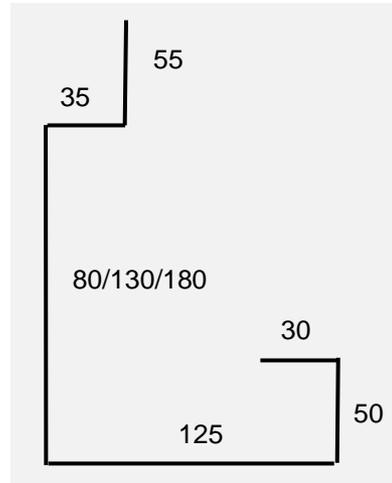
4. Standard Metal Formwork

- Standard metal deck infill

- Infill could be imported, or rolled in-house

- Max 0.6mm gauge required

ESLAB Benefits

Reduction in Concrete

- Reduction in concrete volumes of up to 45% over a comparative conventional slab

- Significant overall weight reduction in the structure

- Increased spans compared to conventional slabs due to lighter self weight

- Less truck deliveries to site

- Smaller piers and foundations

- Reduced building "Transfer" loads

- Faster concrete pours

SHEAR CONNECTOR (SELF TAPPING SCREWS)

SHRINKAGE CONTROL MESH

PANEL CONNECTOR

VARIES

120

Typical concrete topping depth

"FULL" SLAB RIB (2 x "HALF" RIBS)

1200

METAL TRAY FORMWORK
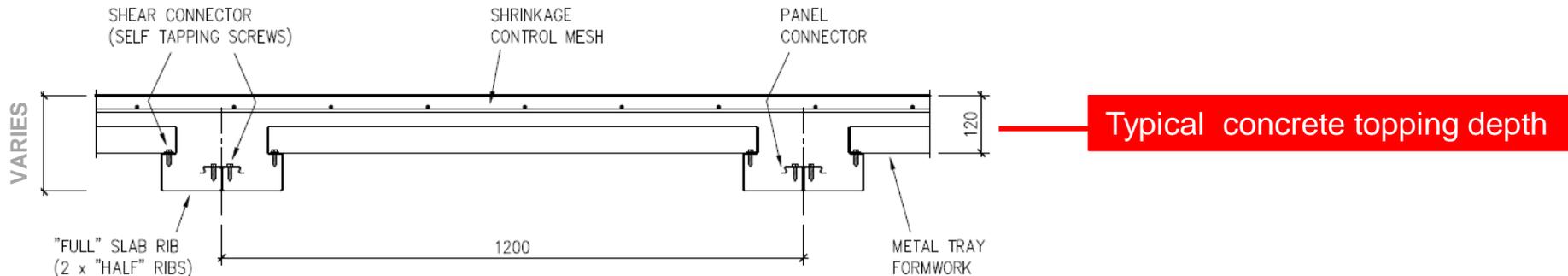
Reduction in Reinforcement

- Reduction in slab reinforcement of up to 60% over conventional slabs

- Large amounts of bottom reinforcement available via the rib flange

- Large amounts of shear reinforcement available via external rib legs

- Integral Fire reinforcement available via unique internal vertical rib legs

Shear reinforcement

Integral fire reinforcement

Bottom reinforcement
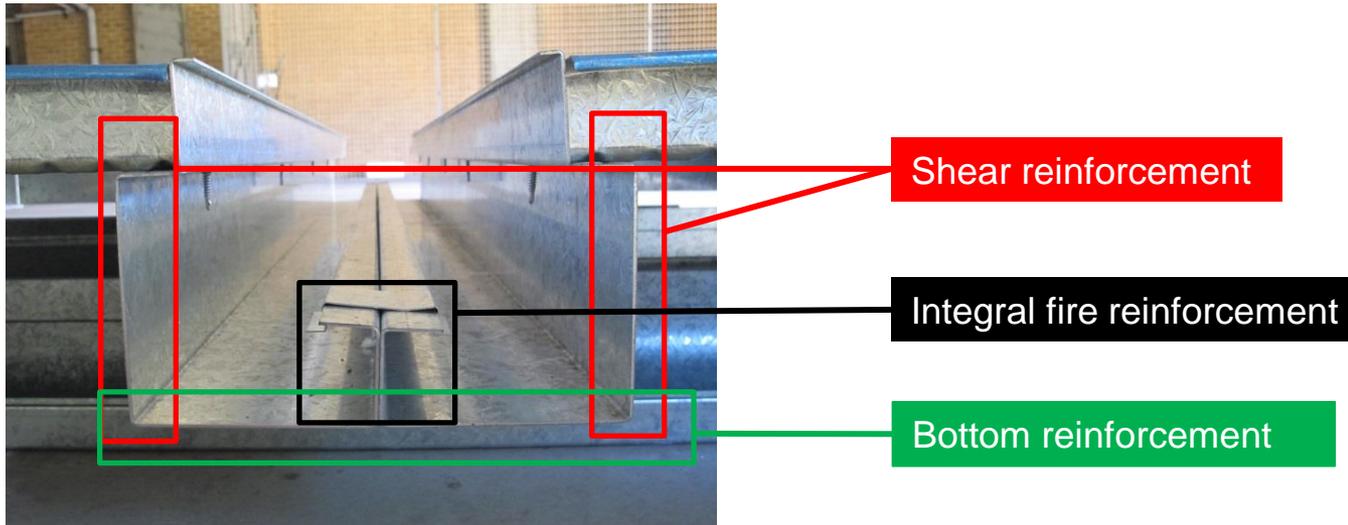
2-Way Cold Rolled Efficiency

- Revolutionary "2-Way" cold rolled system

- Bulk of thicker gauge (1.9-2.4mm) steel can be placed within the slab ribs only

- Costly thicker gauge steel is only used where needed

- Cheaper thinner gauge steel (0.6mm) is used wherever possible

- 2-Way efficiency cannot be matched by any 1-Way cold rolled profile

Secondary span (thin gauge steel)

Primary span (thick gauge steel)
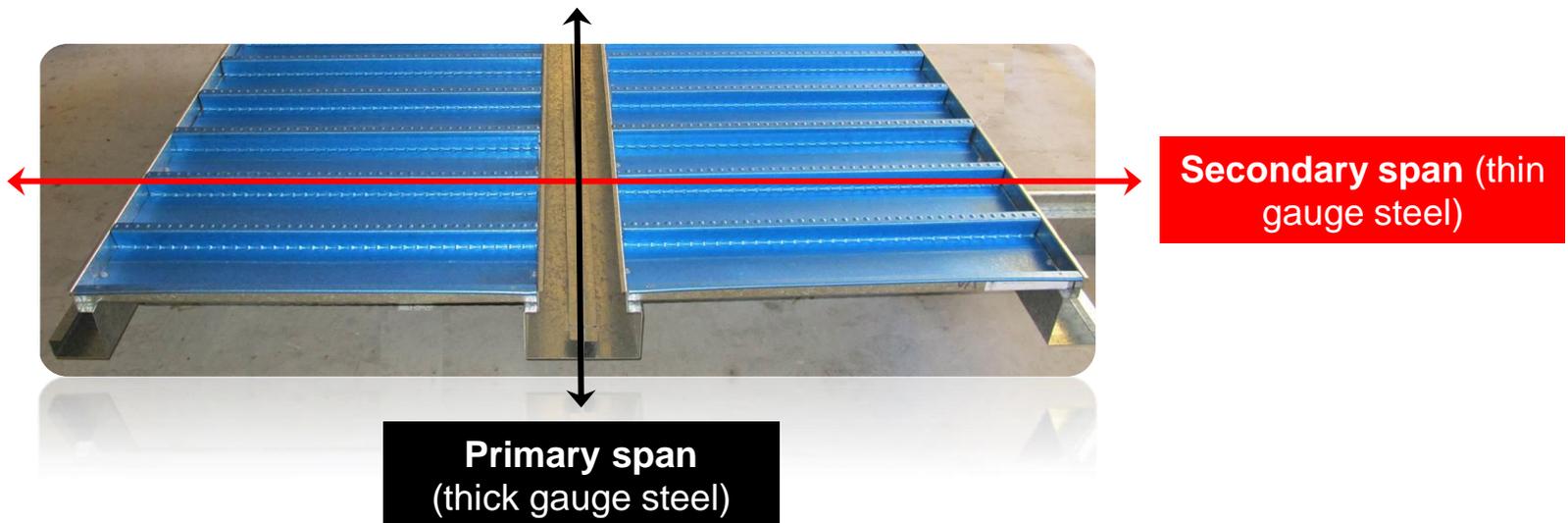
Speed of Construction

- Installation rates of 200m^2/hr are possible via the Eslab "Rapid Installation System"
- Minimal on-site connections means quick installation is possible by unskilled labour

Instant Safe Working Platform

- Prefab panels provide an immediate safe working platform for following trades
- 1200 wide panels make the system inherently quick, safe and simple to install

Materials Handling & Waste Minimisation

- No formwork stripping means reduced materials handling issues between levels
- No formwork stripping eliminates a dangerous and time consuming task
- Use of permanent formwork greatly reduces on-site wastage

Cost Analysis

250 System Example Pricing

250 SLAB SYSTEM - Residential units (185mm Panel Height)

Typical Grid : 7.5m span / 162mm Walls / Slab Ribs @ 1.2m cts.

Blue Denotes Variables

Panel Span =	**7.5**	Panel Length =	7.44
Wall Width =	**0.162**	Infill Area =	7.41
Rib Ctrs =	**1.2**	Panel Effective area =	8.81
Rib Width =	**0.25**	Panel Actual area =	8.93
Panel Clear Span =	7.34	Margin (%) =	
		Wastage (%) =	

Item	Description	Price	Unit	Quantity	$ / Panel	$ / m^2
Slab Ribs						
Rib Connection						
Infill						
Shear Connectors	System costings available on request					
Z Forms						
Assembly						
Transport						
Design & Drafting						
System Cost						
Margin						
Wastage / Contingency						
Sell Price						
Installation						
Installed System Cost						**$101.18**

250 System Comparison Pricing

- 7.5m span with 162mm Walling system support

- Direct comparison to 200mm thick conventional slab

- Cheaper than conventional before any system benefits are considered

TOTAL FLOOR COST COMPARISON - RESIDENTIAL

Typical Grid : 7.5m span / 162mm Walls / Slab Ribs @ 1.2m cts.

Conventianl soffit ($/m^2) = **70**
System Rate ($/m^2)   101.18
Reo Rate ($/kg)   **1.65**
Concrete Rate ($/m^3)   : **230**

All rates are in AUD ($)

	Item	Description	Unit Rate	Unit	Unit/m^2	Cost per m^2
Conventional Slab	Conventional soffit	Incl propping	$ 70.00	-	1.00	$ 70.00
	Reo Rate (Supply and fix)	-	$ 1.65	kg	**20.00**	$ 33.00
	Concrete (Supply and place)	200 mm slab	$ 230.00	m^3	**0.200**	$ 46.00
	Installed System Cost					**$ 149.00**
250 Eslab System	System Rate	Incl propping	$ 101.18	-	1.00	$ 101.18
	Reo Rate (Supply and fix)	-	$ 1.65	kg	**6.00**	$ 9.90
	Concrete (Supply and place)	120mm slab + ribs	$ 230.00	m^3	**0.146**	$ 33.58
	Installed System Cost					**$ 144.66**

ESLAB Manufacture

Steel Rib Production

- Customised roll forming machine required to efficiently produce rib profiles

- Costings have assumed the use of a roll former over the bending of profiles

Metal Infill Sheets

- Infill sheets can be most standard 0.6mm metal deck formwork profiles

- Infill sheets could be imported in standard lengths, or rolled in-house

Panel Assembly

- 1200 wide panels assembled in the factory

- Infill sheets are placed between two "half" rib profiles and screws installed

- Screw centres as per design, but typically installed at 400cts

- Additional screws would be required in central flanges to engage internal fire reo

ESLAB Installation

Rapid Installation System

- Installation rates of up to 200m^2/hr are possible

- Panels delivered in stacked packs (6 min)

- Average pack = 50m^2 (6 x 7m long x 1.2m wide)

- Approx 15min Crane time to install 6 panels using the "strap" delivery system

Once on the deck the pack is manoeuvred by the crane to efficiently deliver each bottom panel into position.

Once in position the "builders strap" / "steel strap" is simply cut with snips to release the lowest panel into position.
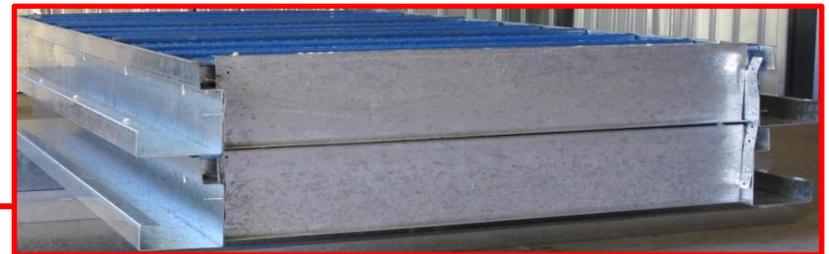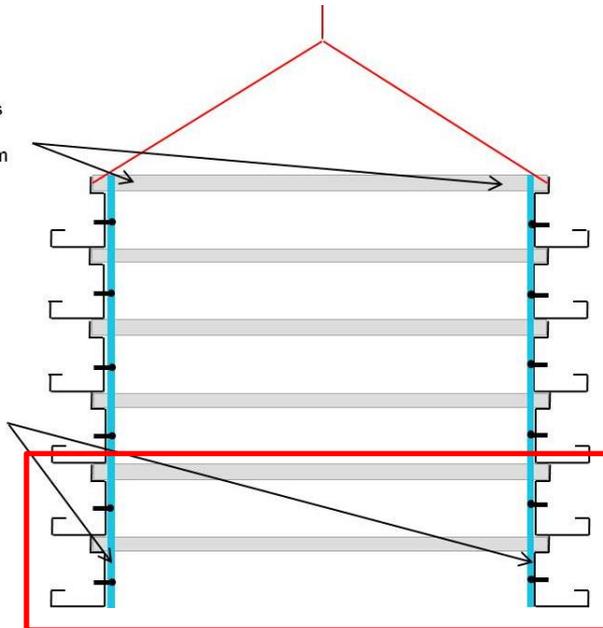
Rapid Installation Process

- Crane lifts a pack of panels onto the deck and manoeuvres into position

- Once in position the bottom panel is released by cutting the panel straps

- This process is quickly repeated until the entire pack has been installed

- Releasing each panel takes 2 men approx 15 seconds
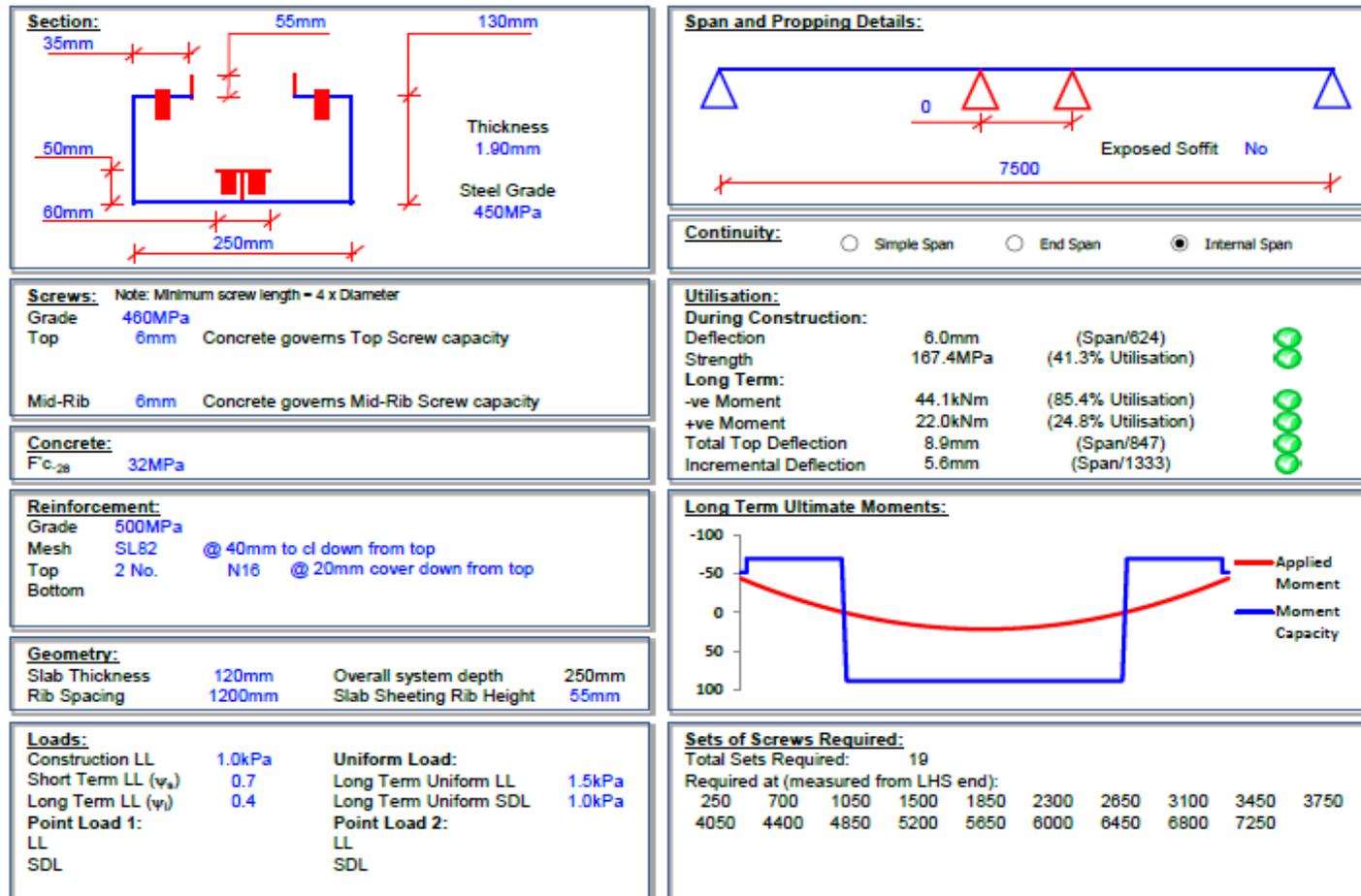

View panel strap release video >

ESLAB
Design & Details

Proprietary Design Software

Example Residential Span

- 7500mm slab span
- 1.5kPa (LL) / 1.0kPa (SDL)
- 250 overall slab depth
- 120mm topping concrete
- 1200mm rib spacing
- Central prop line

Section:
35mm, 55mm, 130mm, 50mm, 60mm, 250mm
Thickness 1.90mm
Steel Grade 450MPa

Screws: Note: Minimum screw length = 4 x Diameter
Grade 460MPa
Top 6mm Concrete governs Top Screw capacity
Mid-Rib 6mm Concrete governs Mid-Rib Screw capacity

Concrete:
F'c$_{28}$ 32MPa

Reinforcement:
Grade 500MPa
Mesh SL82 @ 40mm to cl down from top
Top 2 No. N16 @ 20mm cover down from top
Bottom

Geometry:
Slab Thickness 120mm Overall system depth 250mm
Rib Spacing 1200mm Slab Sheeting Rib Height 55mm

Loads:
Construction LL 1.0kPa
Short Term LL (ψ_s) 0.7
Long Term LL (ψ_l) 0.4
Point Load 1:
LL
SDL

Uniform Load:
Long Term Uniform LL 1.5kPa
Long Term Uniform SDL 1.0kPa
Point Load 2:
LL
SDL

Span and Propping Details:
0
7500
Exposed Soffit No

Continuity: ○ Simple Span ○ End Span ◉ Internal Span

Utilisation:
During Construction:
Deflection 6.0mm (Span/624)
Strength 167.4MPa (41.3% Utilisation)
Long Term:
-ve Moment 44.1kNm (85.4% Utilisation)
+ve Moment 22.0kNm (24.8% Utilisation)
Total Top Deflection 8.9mm (Span/847)
Incremental Deflection 5.6mm (Span/1333)

Long Term Ultimate Moments:
Applied Moment
Moment Capacity

Sets of Screws Required:
Total Sets Required: 19
Required at (measured from LHS end):

250	700	1050	1500	1850	2300	2650	3100	3450	3750
4050	4400	4850	5200	5650	6000	6450	6800	7250	

Span Table
Construction
Un-propped

Un-propped Spans (Construction / Simply Supported)

200 Slab		Construction LL = 1.0kPa

Rib Spacing	Span/150	Span/240
600	4000	3400
1200	3250	2850

250 Slab

Rib Spacing	Span/150	Span/240
600	5000	4400
1200	4300	3750

300 Slab

Rib Spacing	Span/150	Span/240
600	6150	5400
1200	5000	4500

Span Table
Long Term Propped

Propped Spans (Long Term / Internal span)

SDL = 1.0kPa

200 Slab

Rib Spacing	1.5 kPa (LL)	3.0kPa (LL)	5.0kPa (LL)
600	9750	8750	8000
1200	8000	7000	6000

250 Slab

Rib Spacing	1.5 kPa (LL)	3.0kPa (LL)	5.0kPa (LL)
600	12000	11000	9750
1200	9250	8750	7750

300 Slab

Rib Spacing	1.5 kPa (LL)	3.0kPa (LL)	5.0kPa (LL)
600	12500	12000	10750
1200	10500	9500	9000
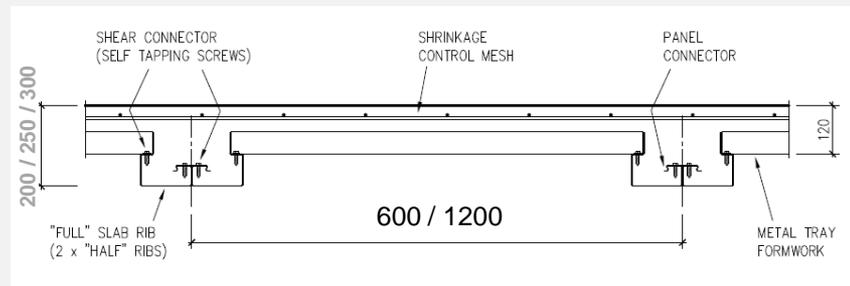
Notes
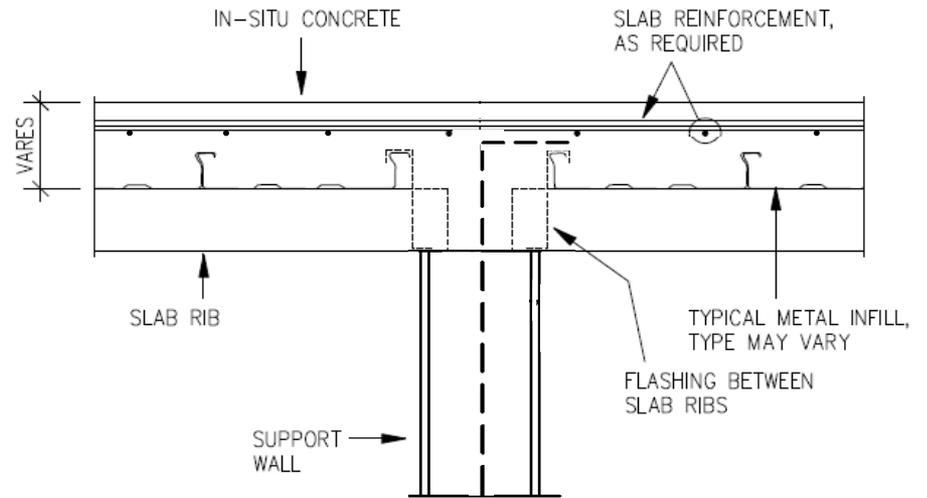- Internal spans analysed
- Additional reinforcement varies
- Deflection limit ≥ Span/250
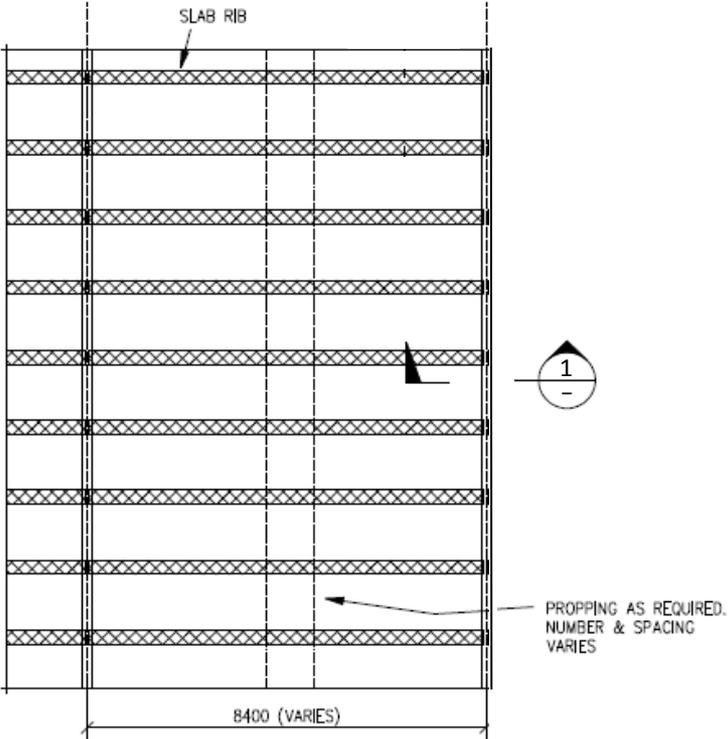
ESLAB to Wall System Connection
(Internal Wall)

SLAB RIB

1
—

PROPPING AS REQUIRED.
NUMBER & SPACING
VARIES

8400 (VARIES)

SLAB PLAN
SCALE 1:100

IN−SITU CONCRETE

SLAB REINFORCEMENT,
AS REQUIRED

VARES

SLAB RIB

TYPICAL METAL INFILL,
TYPE MAY VARY

FLASHING BETWEEN
SLAB RIBS

SUPPORT
WALL

SECTION
SCALE 1:10

1
—

ESLAB to Wall System Connection
(External Wall)

SLAB RIB

IN-SITU CONCRETE

SLAB REINFORCEMENT, AS REQUIRED

VARES

SLAB RIB

SUPPORT WALL

PROPPING AS REQUIRED. NUMBER & SPACING VARIES

8400 (VARIES)
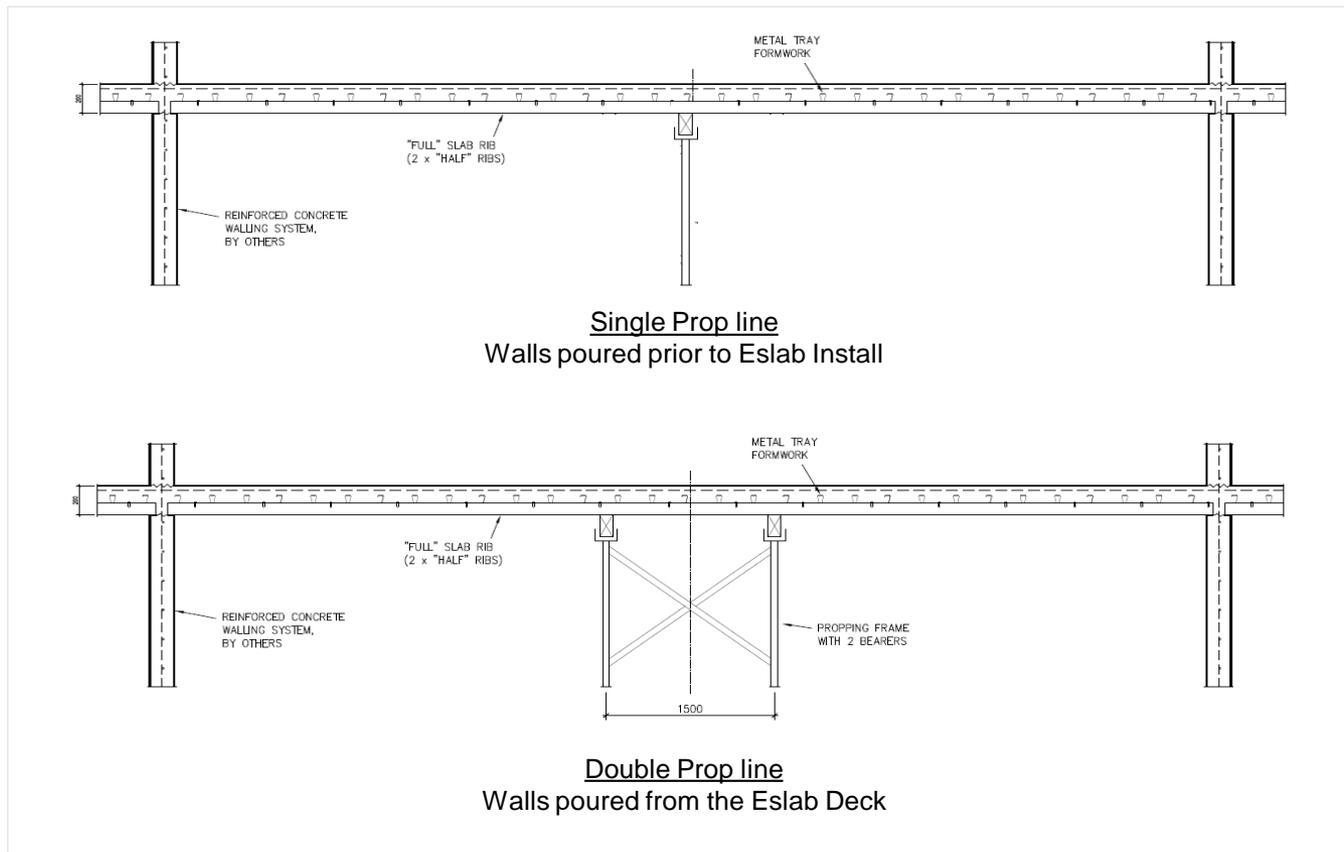
SLAB PLAN
SCALE 1:100
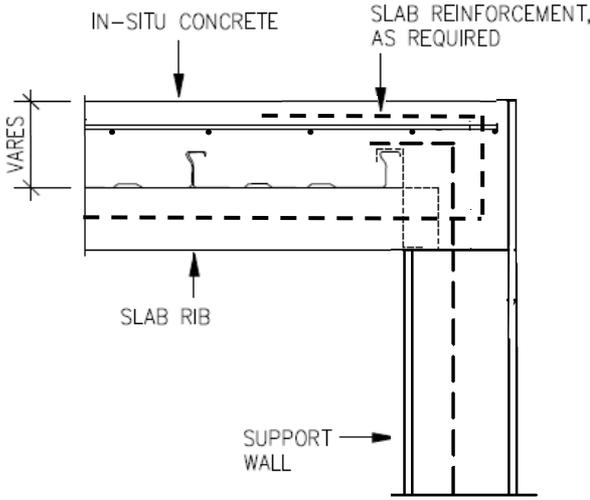
SECTION
SCALE 1:10
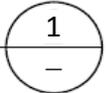
System Propping

- Typically the system only requires a central prop
- A double prop line (frame) would be required to pour the walls from the deck
- The bare system is very light weighing approx 20-25kg/m^2

Single Prop line
Walls poured prior to Eslab Install

Double Prop line
Walls poured from the Eslab Deck

Questions