MiTek®

# PRESENTATION FOR BOINZ WAIKATO/BOP AUG 2024

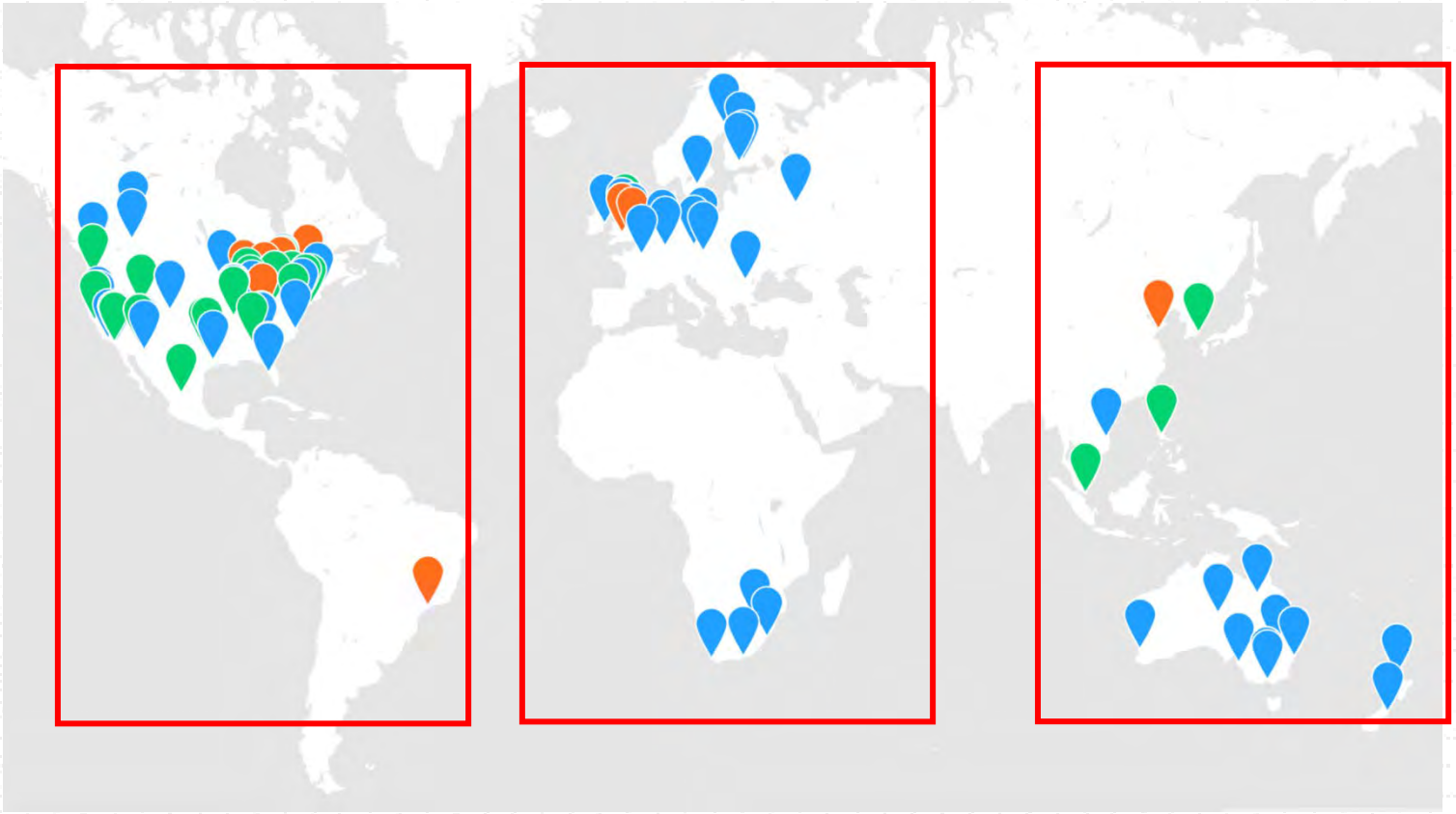
By: IN LING NG - BE (Hons)  CPEng
Engineering Manager NZ

# Overview

1. **Introduction to MiTek**
2. **MiTek Fabricated Products Range and Trusses**
   - GANGNAIL – Roof & Floor Trusses and Flitch Beams
   - LUMBERLOK Range
   - BOWMAC Range
3. **New Products**
   - Sapphire Software
   - TPS 140
   - StudLok Screws
   - Z4 Continuous Tie-Down System
4. **FAQs**

# INTRODUCTION TO MITEK

NA EMEA APAC

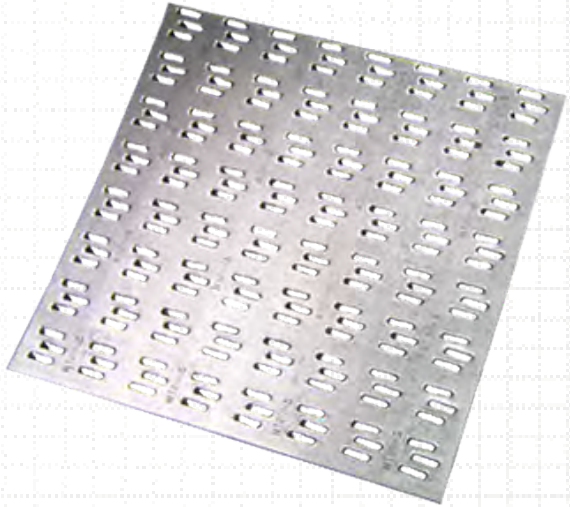


# INTRODUCTION TO MITEK

# INTRODUCTION TO MITEK

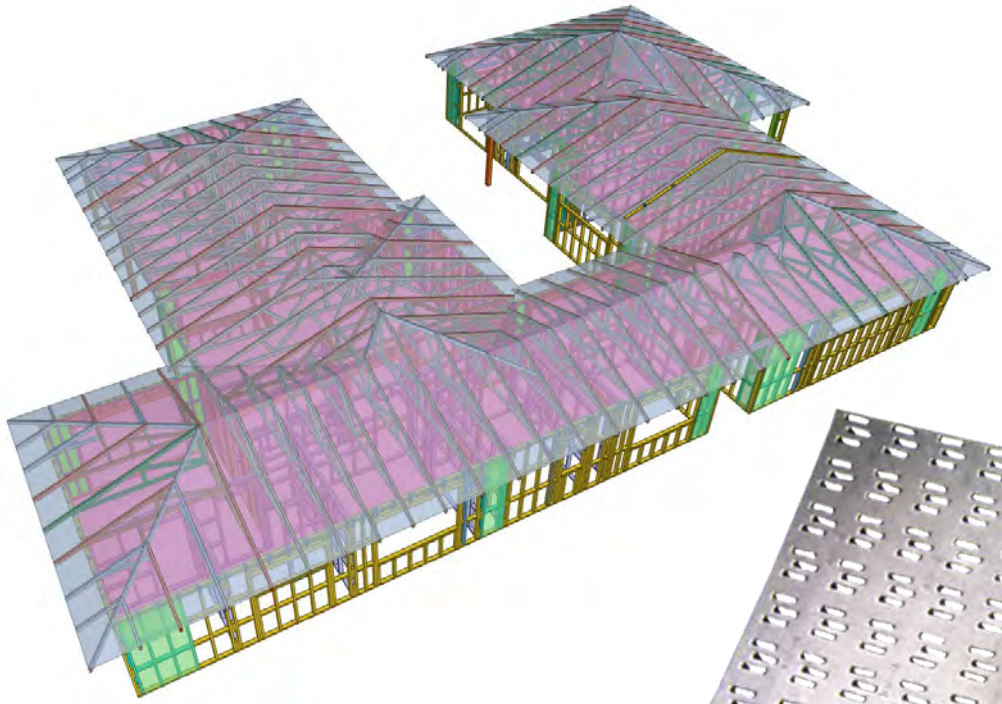
# MiTek ROOF TRUSSES

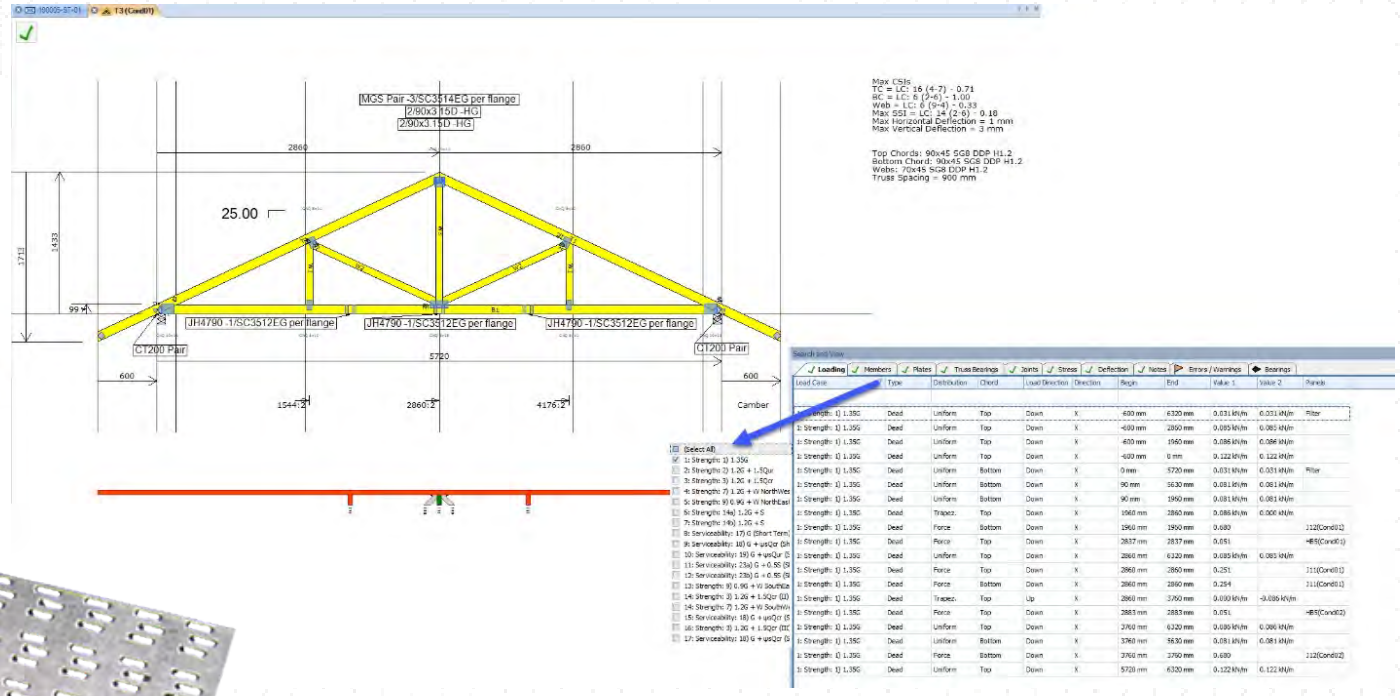
**GANGNAIL PLATES**



# MiTek ROOF TRUSSES

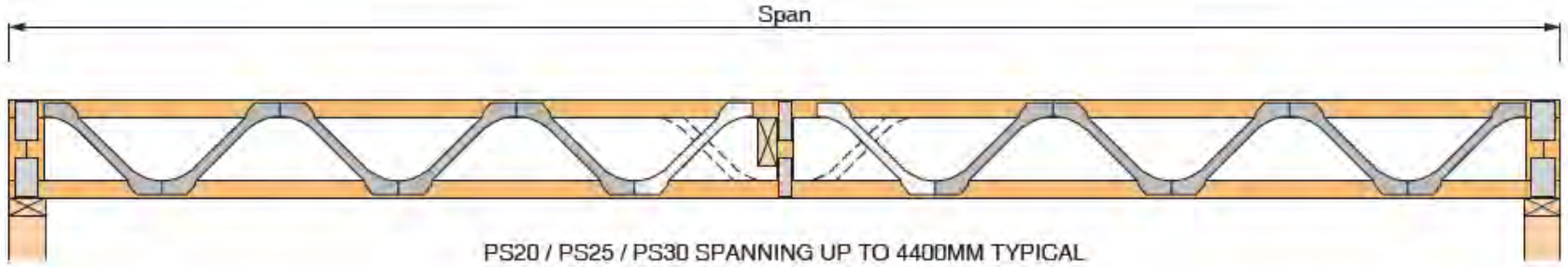
**SAPPHIRE 3-D MODEL & TRUSS DESIGNS**





# MiTek FLOOR TRUSSES

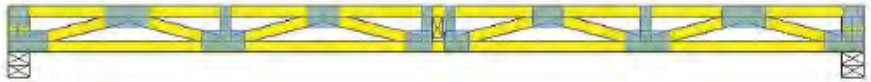
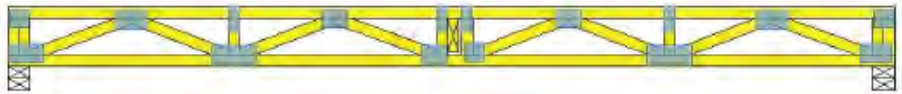
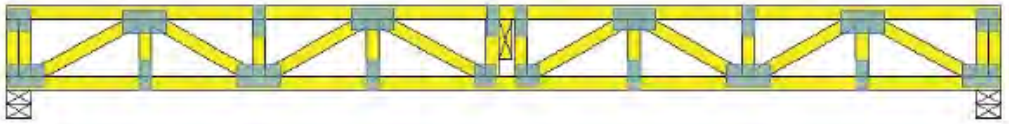
**Posi-Strut**




# MiTek FLOOR TRUSSES

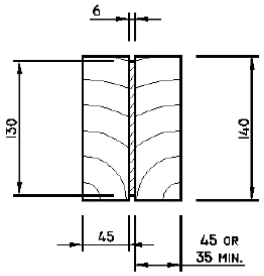
**Timber Floor Trusses**

## TABLE 1 - SG8

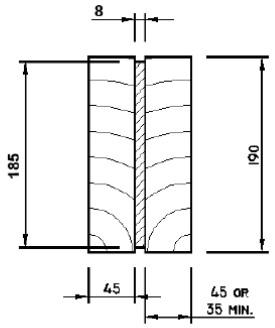
| Truss size | 400 c/c | 450 c/c | 600 c/c | Strongback size | Indicative web setting out |
|---|---|---|---|---|---|
| 190 x 90 | 3.6m | 3.5m | 3.1m | 90 x 45 SG8 |  |
| 240 x 90 | 4.5m | 4.2m | 3.7m | 140 x 45 SG8 |  |
| 290 x 90 | 5.1m | 4.8m | 4.2m | 190 x 45 SG8 |  |

# MiTek / GANGNAIL FLITCH BEAMS

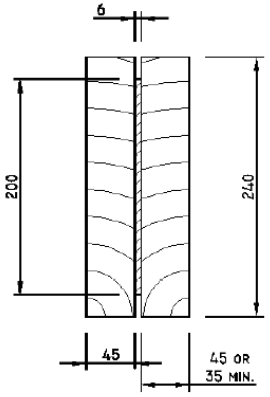
**Flitch Beams**



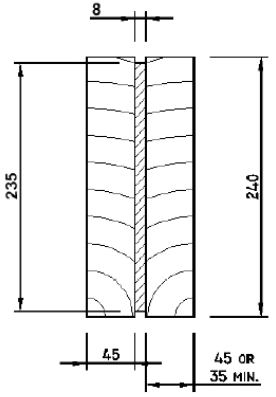

FB15L



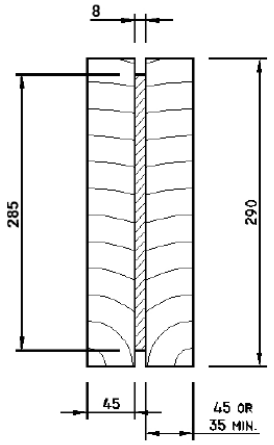

FB20M




FB25L




FB25M




FB30M

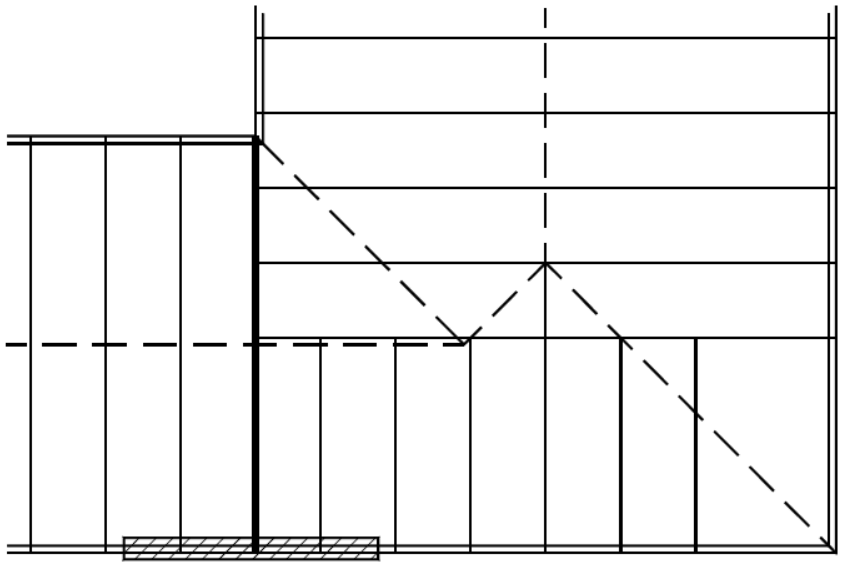
# MiTek / GANGNAIL FLITCH BEAMS

## Flitch Beams

**TABLE 7A: MSG8, VSG8, MSG6 or Unverified No. 1 Framing**
LINTEL SUPPORTING GIRDER/SETBACK TRUSSES WITH LIGHT ROOF

| LINTEL SIZE | SETBACK (m) | MAXIMUM LINTEL SPAN (m) GIRDER TRUSS SPAN (m) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 14.0 | 15.0 |
| FB15L | 1.2 | 3.21 | 3.02 | 2.80 | 2.61 | 2.44 | 2.30 | 2.18 | 2.07 | 1.97 | 1.88 | 1.80 |
| | 2.4 | 2.73 | 2.45 | 2.22 | 2.04 | 1.88 | 1.74 | 1.63 | 1.53 | 1.44 | 1.36 | 1.29 |
| | 3.6 | 2.29 | 2.02 | 1.80 | 1.63 | 1.49 | 1.37 | 1.27 | 1.18 | 1.10 | 1.03 | 0.98 |
| | 4.8 | 1.94 | 1.69 | 1.50 | 1.34 | 1.21 | 1.11 | 1.02 | 0.95 | 0.88 | 0.82 | 0.77 |
| | 6.0 | 1.68 | 1.45 | 1.27 | 1.13 | 1.02 | 0.93 | 0.85 | 0.79 | 0.73 | 0.68 | 0.64 |
| | 7.5 | 1.42 | 1.21 | 1.06 | 0.94 | 0.84 | 0.76 | 0.70 | 0.64 | 0.60 | 0.56 | 0.52 |
| | 10.0 | 1.12 | 0.95 | 0.83 | 0.73 | 0.65 | 0.59 | 0.54 | 0.49 | 0.46 | 0.43 | 0.40 |
| FB20M | 1.2 | 4.80 | 4.63 | 4.48 | 4.36 | 4.23 | 4.06 | 3.87 | 3.69 | 3.54 | 3.39 | 3.27 |
| | 2.4 | 4.56 | 4.38 | 4.16 | 3.85 | 3.60 | 3.37 | 3.18 | 3.01 | 2.86 | 2.72 | 2.59 |
| | 3.6 | 4.35 | 3.95 | 3.60 | 3.30 | 3.05 | 2.83 | 2.65 | 2.49 | 2.35 | 2.22 | 2.10 |
| | 4.8 | 3.92 | 3.49 | 3.14 | 2.85 | 2.62 | 2.41 | 2.24 | 2.09 | 1.96 | 1.85 | 1.75 |
| | 6.0 | 3.52 | 3.10 | 2.76 | 2.49 | 2.27 | 2.09 | 1.93 | 1.79 | 1.68 | 1.57 | 1.48 |
| | 7.5 | 3.10 | 2.70 | 2.39 | 2.14 | 1.94 | 1.77 | 1.63 | 1.51 | 1.41 | 1.32 | 1.24 |
| | 10.0 | 2.56 | 2.20 | 1.93 | 1.71 | 1.54 | 1.40 | 1.29 | 1.19 | 1.10 | 1.03 | 0.96 |
| FB25L | 1.2 | 5.04 | 4.87 | 4.71 | 4.42 | 4.18 | 3.96 | 3.77 | 3.60 | 3.44 | 3.31 | 3.18 |
| | 2.4 | 4.80 | 4.39 | 4.04 | 3.74 | 3.49 | 3.28 | 3.09 | 2.92 | 2.77 | 2.64 | 2.51 |
| | 3.6 | 4.27 | 3.84 | 3.49 | 3.20 | 2.95 | 2.74 | 2.56 | 2.41 | 2.27 | 2.14 | 2.03 |
| | 4.8 | 3.80 | 3.38 | 3.03 | 2.76 | 2.53 | 2.33 | 2.16 | 2.02 | 1.89 | 1.78 | 1.68 |
| | 6.0 | 3.40 | 2.99 | 2.67 | 2.41 | 2.19 | 2.01 | 1.86 | 1.73 | 1.61 | 1.51 | 1.43 |
| | 7.5 | 2.99 | 2.60 | 2.30 | 2.06 | 1.87 | 1.70 | 1.57 | 1.45 | 1.35 | 1.27 | 1.19 |
| | 10.0 | 2.46 | 2.12 | 1.85 | 1.65 | 1.48 | 1.35 | 1.23 | 1.14 | 1.06 | 0.99 | 0.92 |
| FB25M | 1.2 | 5.79 | 5.59 | 5.41 | 5.26 | 5.13 | 5.01 | 4.91 | 4.81 | 4.71 | 4.53 | 4.37 |
| | 2.4 | 5.53 | 5.32 | 5.14 | 4.99 | 4.85 | 4.64 | 4.39 | 4.17 | 3.97 | 3.79 | 3.63 |
| | 3.6 | 5.31 | 5.10 | 4.91 | 4.63 | 4.30 | 4.02 | 3.78 | 3.56 | 3.37 | 3.20 | 3.05 |
| | 4.8 | 5.12 | 4.90 | 4.48 | 4.10 | 3.79 | 3.52 | 3.28 | 3.08 | 2.90 | 2.74 | 2.60 |
| | 6.0 | 4.95 | 4.47 | 4.02 | 3.66 | 3.36 | 3.10 | 2.88 | 2.69 | 2.53 | 2.38 | 2.25 |
| | 7.5 | 4.51 | 3.97 | 3.55 | 3.20 | 2.92 | 2.68 | 2.48 | 2.31 | 2.16 | 2.03 | 1.91 |
| | 10.0 | 3.82 | 3.32 | 2.93 | 2.63 | 2.38 | 2.17 | 2.00 | 1.85 | 1.72 | 1.61 | 1.51 |
| FB30M | 1.2 | 6.73 | 6.50 | 6.30 | 6.13 | 5.98 | 5.84 | 5.72 | 5.61 | 5.50 | 5.41 | 5.32 |
| | 2.4 | 6.47 | 6.23 | 6.02 | 5.84 | 5.69 | 5.55 | 5.42 | 5.31 | 5.11 | 4.89 | 4.70 |
| | 3.6 | 6.24 | 5.99 | 5.78 | 5.60 | 5.44 | 5.26 | 4.96 | 4.69 | 4.45 | 4.24 | 4.05 |
| | 4.8 | 6.03 | 5.78 | 5.57 | 5.38 | 5.02 | 4.69 | 4.39 | 4.14 | 3.91 | 3.71 | 3.53 |
| | 6.0 | 5.85 | 5.59 | 5.36 | 4.91 | 4.53 | 4.20 | 3.92 | 3.68 | 3.46 | 3.27 | 3.10 |
| | 7.5 | 5.64 | 5.34 | 4.81 | 4.37 | 4.00 | 3.70 | 3.43 | 3.20 | 3.00 | 2.83 | 2.67 |
| | 10.0 | 5.21 | 4.56 | 4.06 | 3.66 | 3.32 | 3.05 | 2.81 | 2.61 | 2.44 | 2.28 | 2.15 |

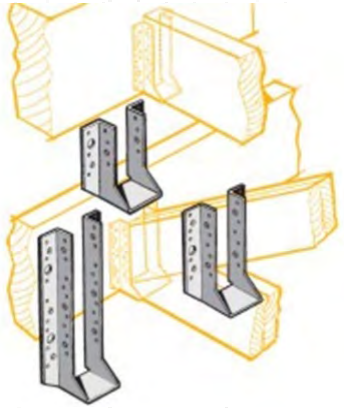
E.g. Design table for point load from girder truss

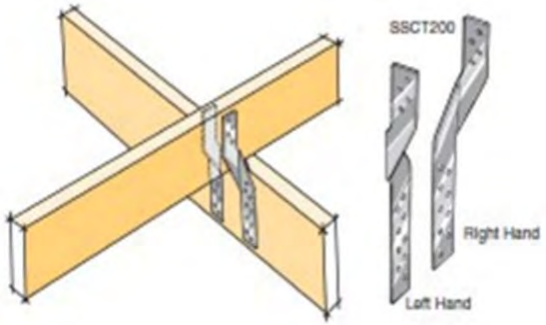


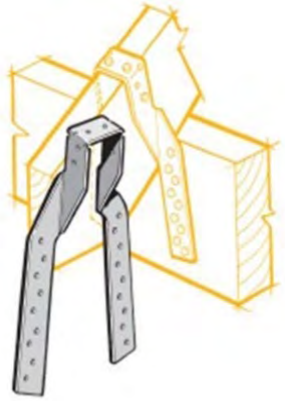
# MiTek Product Range - LUMBERLOK

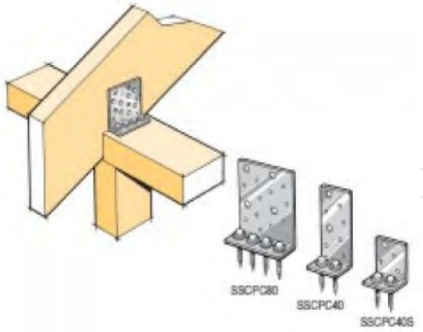
LUMBERLOK®
TIMBER CONNECTORS

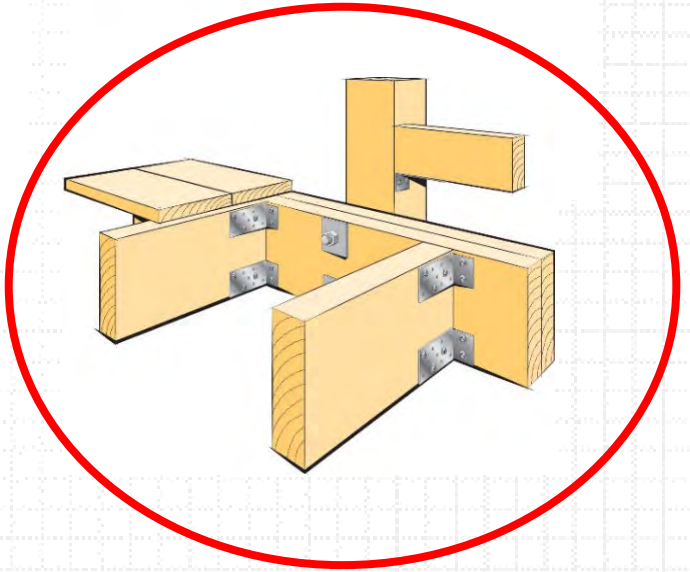
- Mainly used in residential projects;  can be used in commercial as well.
- Mainly 1mm to 2mm steel
- Fixed with nails and screws
- Aligned to NZS 3604
- All CodeMark products





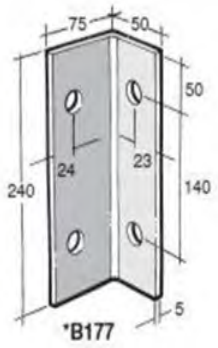


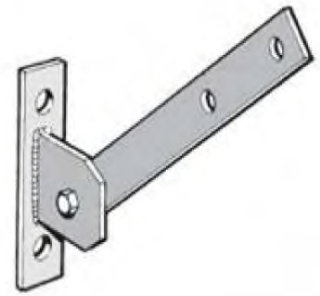



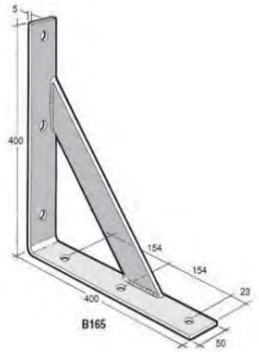
# MiTek Product Range - BOWMAC

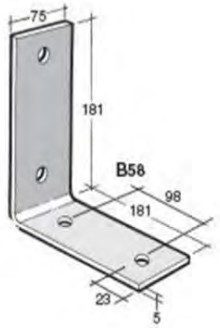
BOWMAC®
STRUCTURAL BRACKETS

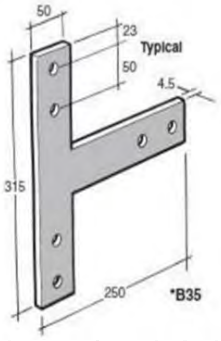
- Mainly 5mm steel
- Fixed with M12 bolts
- HDG and Stainless for external use
- For residential and commercial projects

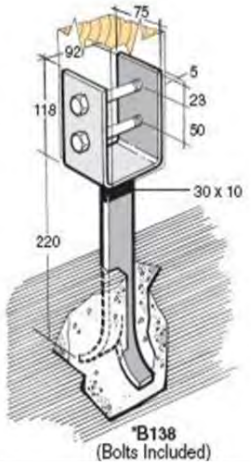


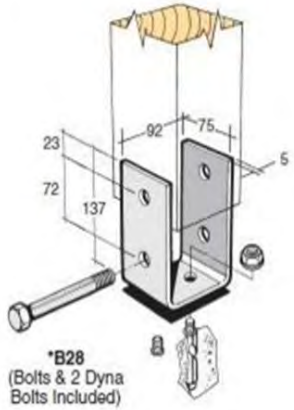



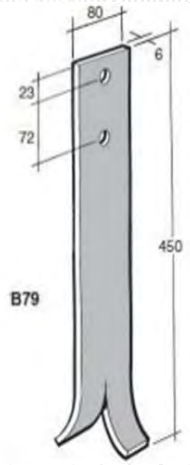


# MiTek OSG and NZS3604-2011

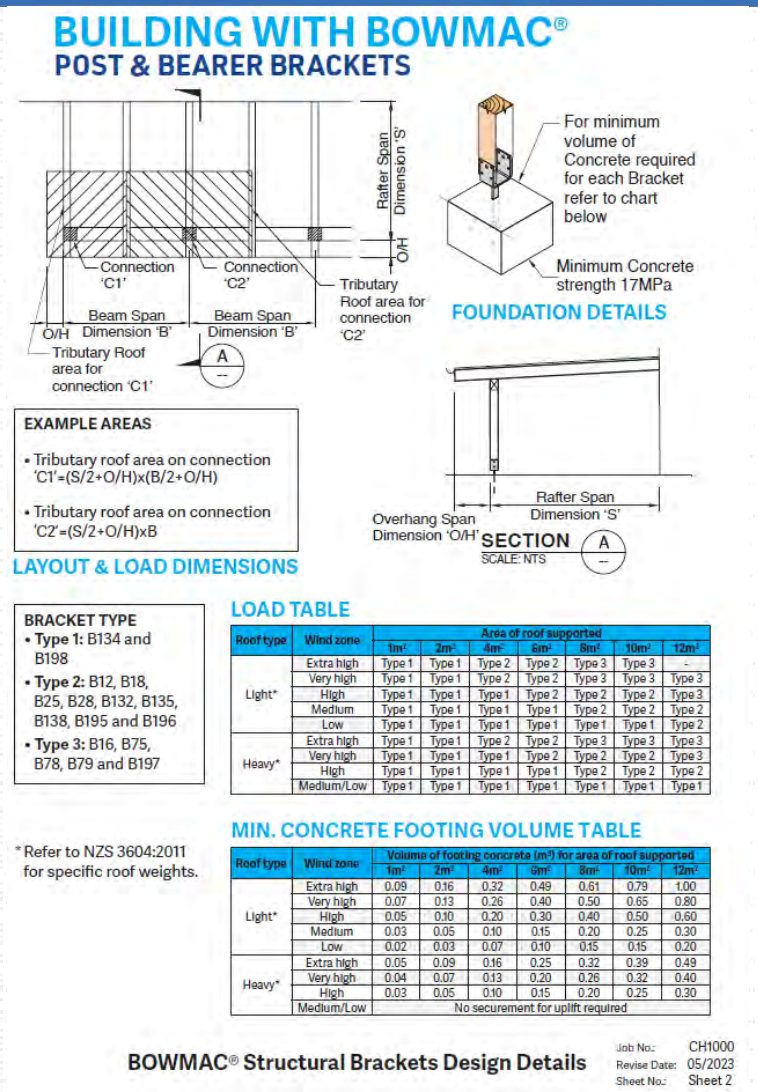
- Most LUMBERLOK & BOWMAC brackets are in the MiTek ON- SITE GUIDE
- The OSG is closely aligned with NZS 3604


NZS 3604:2011 – ACCEPTABLE SOLUTION

# MiTek Product Range - BOWMAC

BOWMAC®
STRUCTURAL BRACKETS

- Near the back of OSG (Pg. 115 on)
- Design tables for simple Post & Beam brackets
- Some bracket capacities



## BUILDING WITH BOWMAC®
### POST & BEARER BRACKETS



For minimum volume of Concrete required for each Bracket refer to chart below

Minimum Concrete strength 17MPa

**FOUNDATION DETAILS**



**EXAMPLE AREAS**

- Tributary roof area on connection 'C1'=(S/2+O/H)x(B/2+O/H)
- Tributary roof area on connection 'C2'=(S/2+O/H)xB

**LAYOUT & LOAD DIMENSIONS**

**BRACKET TYPE**

- **Type 1:** B134 and B198
- **Type 2:** B12, B18, B25, B28, B132, B135, B138, B195 and B196
- **Type 3:** B16, B75, B78, B79 and B197

**LOAD TABLE**

| Roof type | Wind zone | Area of roof supported | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1m² | 2m² | 4m² | 6m² | 8m² | 10m² | 12m² |
| Light* | Extra high | Type 1 | Type 1 | Type 2 | Type 2 | Type 3 | Type 3 | - |
| | Very high | Type 1 | Type 1 | Type 2 | Type 2 | Type 3 | Type 3 | Type 3 |
| | High | Type 1 | Type 1 | Type 1 | Type 2 | Type 2 | Type 2 | Type 3 |
| | Medium | Type 1 | Type 1 | Type 1 | Type 1 | Type 2 | Type 2 | Type 2 |
| | Low | Type 1 | Type 1 | Type 1 | Type 1 | Type 1 | Type 1 | Type 2 |
| Heavy* | Extra high | Type 1 | Type 1 | Type 2 | Type 2 | Type 3 | Type 3 | Type 3 |
| | Very high | Type 1 | Type 1 | Type 1 | Type 2 | Type 2 | Type 2 | Type 3 |
| | High | Type 1 | Type 1 | Type 1 | Type 1 | Type 2 | Type 2 | Type 2 |
| | Medium/Low | Type 1 | Type 1 | Type 1 | Type 1 | Type 1 | Type 1 | Type 1 |

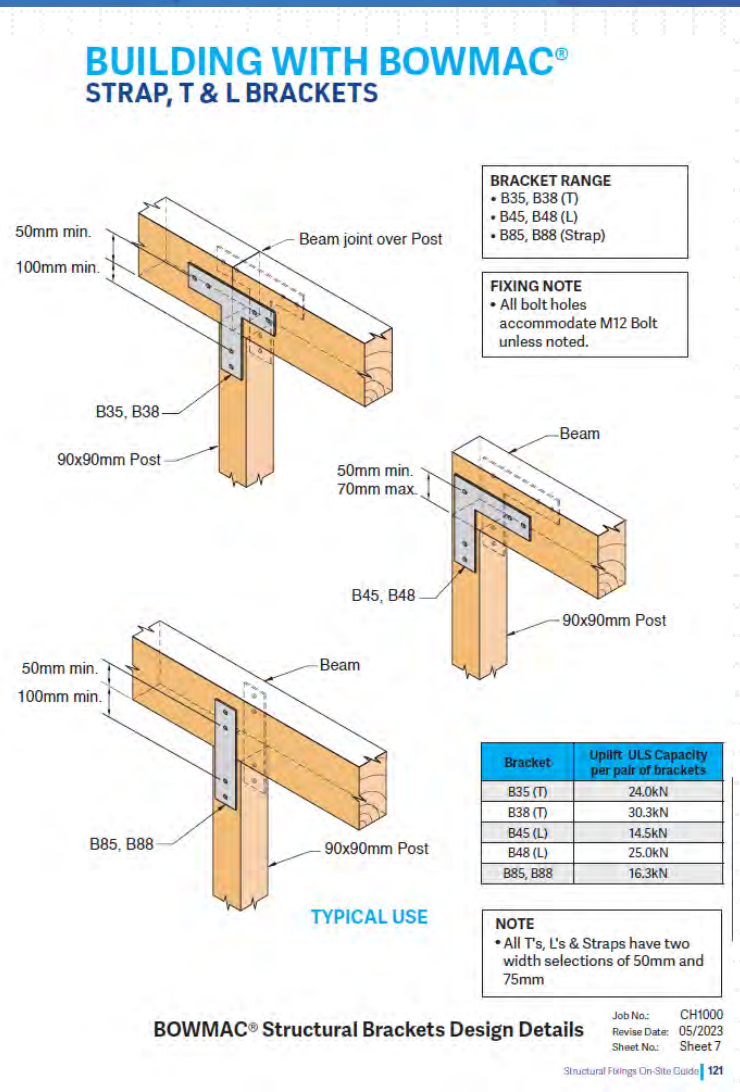
* Refer to NZS 3604:2011 for specific roof weights.

**MIN. CONCRETE FOOTING VOLUME TABLE**

| Roof type | Wind zone | Volume of footing concrete (m³) for area of roof supported | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1m² | 2m² | 4m² | 6m² | 8m² | 10m² | 12m² |
| Light* | Extra high | 0.09 | 0.16 | 0.32 | 0.49 | 0.61 | 0.79 | 1.00 |
| | Very high | 0.07 | 0.13 | 0.26 | 0.40 | 0.50 | 0.65 | 0.80 |
| | High | 0.05 | 0.10 | 0.20 | 0.30 | 0.40 | 0.50 | 0.60 |
| | Medium | 0.03 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 |
| | Low | 0.02 | 0.03 | 0.07 | 0.10 | 0.15 | 0.15 | 0.20 |
| Heavy* | Extra high | 0.05 | 0.09 | 0.16 | 0.25 | 0.32 | 0.39 | 0.49 |
| | Very high | 0.04 | 0.07 | 0.13 | 0.20 | 0.26 | 0.32 | 0.40 |
| | High | 0.03 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 |
| | Medium/Low | No securement for uplift required | | | | | | |

**BOWMAC® Structural Brackets Design Details**

Job No.: CH1000
Revise Date: 05/2023
Sheet No.: Sheet 2



## BUILDING WITH BOWMAC®
### STRAP, T & L BRACKETS

**BRACKET RANGE**

- B35, B38 (T)
- B45, B48 (L)
- B85, B88 (Strap)

**FIXING NOTE**

- All bolt holes accommodate M12 Bolt unless noted.



**TYPICAL USE**

| Bracket | Uplift ULS Capacity per pair of brackets |
|---|---|
| B35 (T) | 24.0kN |
| B38 (T) | 30.3kN |
| B45 (L) | 14.5kN |
| B48 (L) | 25.0kN |
| B85, B88 | 16.3kN |

**NOTE**

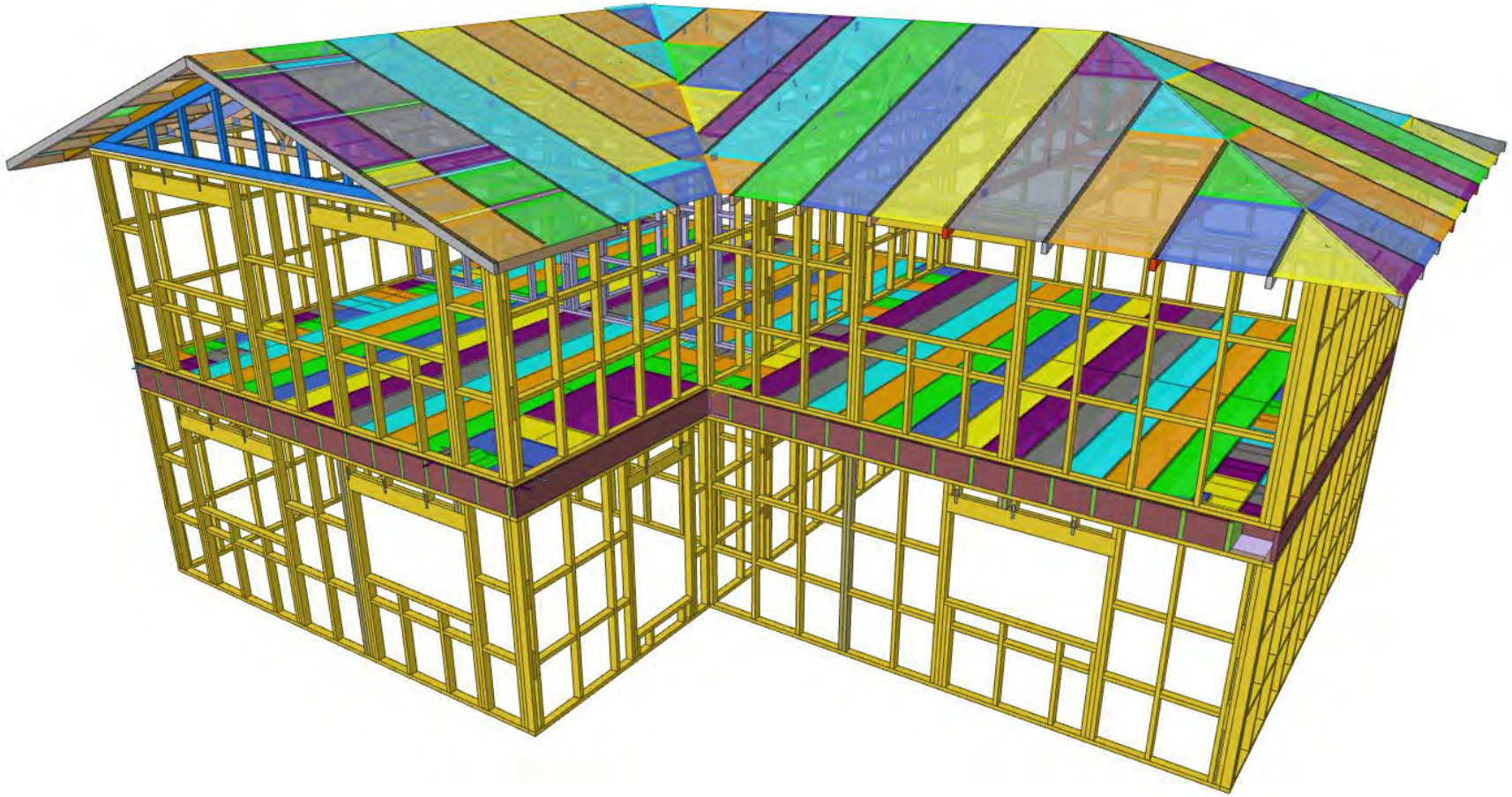
- All T's, L's & Straps have two width selections of 50mm and 75mm

**BOWMAC® Structural Brackets Design Details**

Job No.: CH1000
Revise Date: 05/2023
Sheet No.: Sheet 7

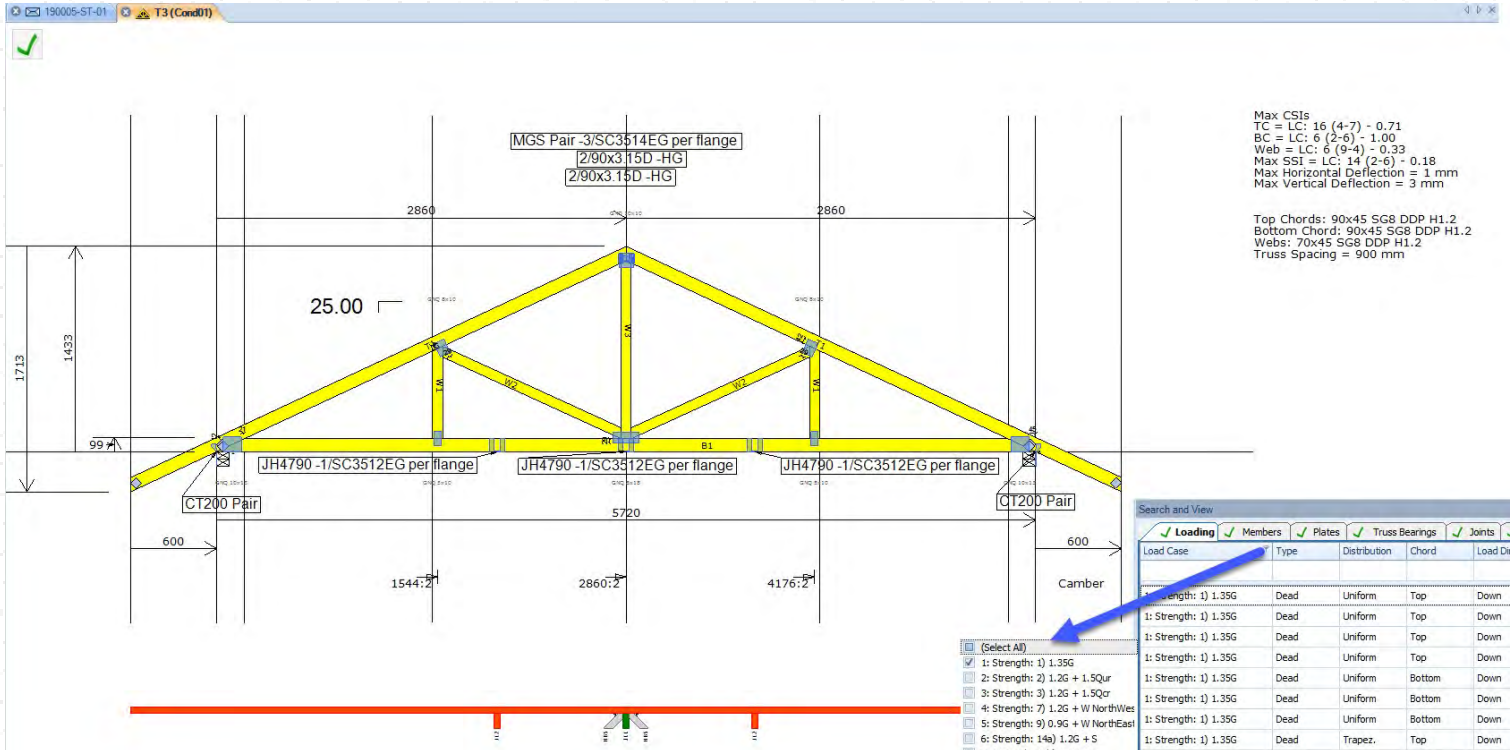
# New Technology – SAPPHIRE Software

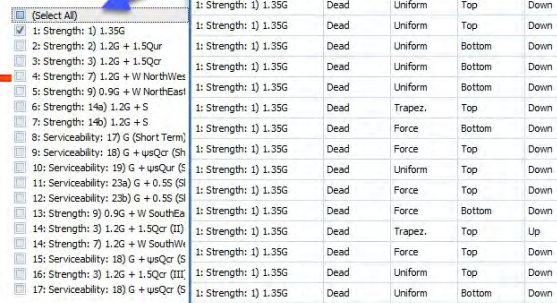
- 3-D Model & View
- Intelligent Roof planes
- Each block of colour indicates the load between trusses

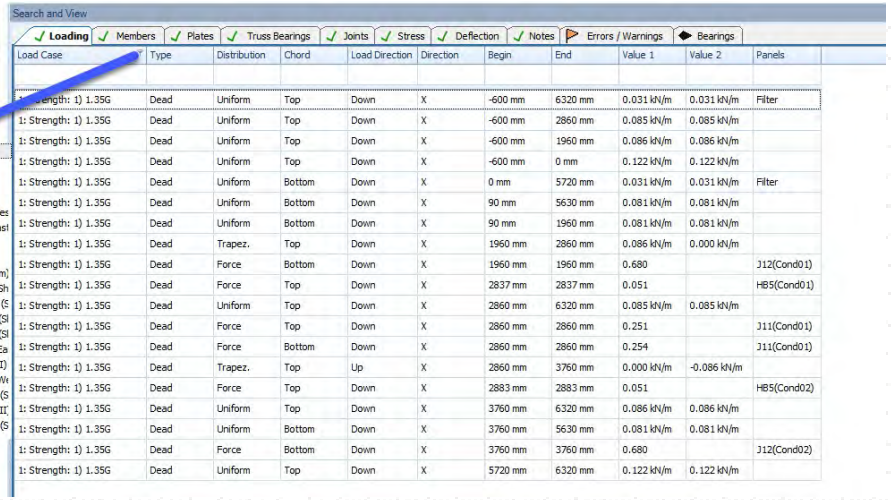


# New Technology – SAPPHIRE Software

- Typical Truss Design & Various ULS Load Combinations



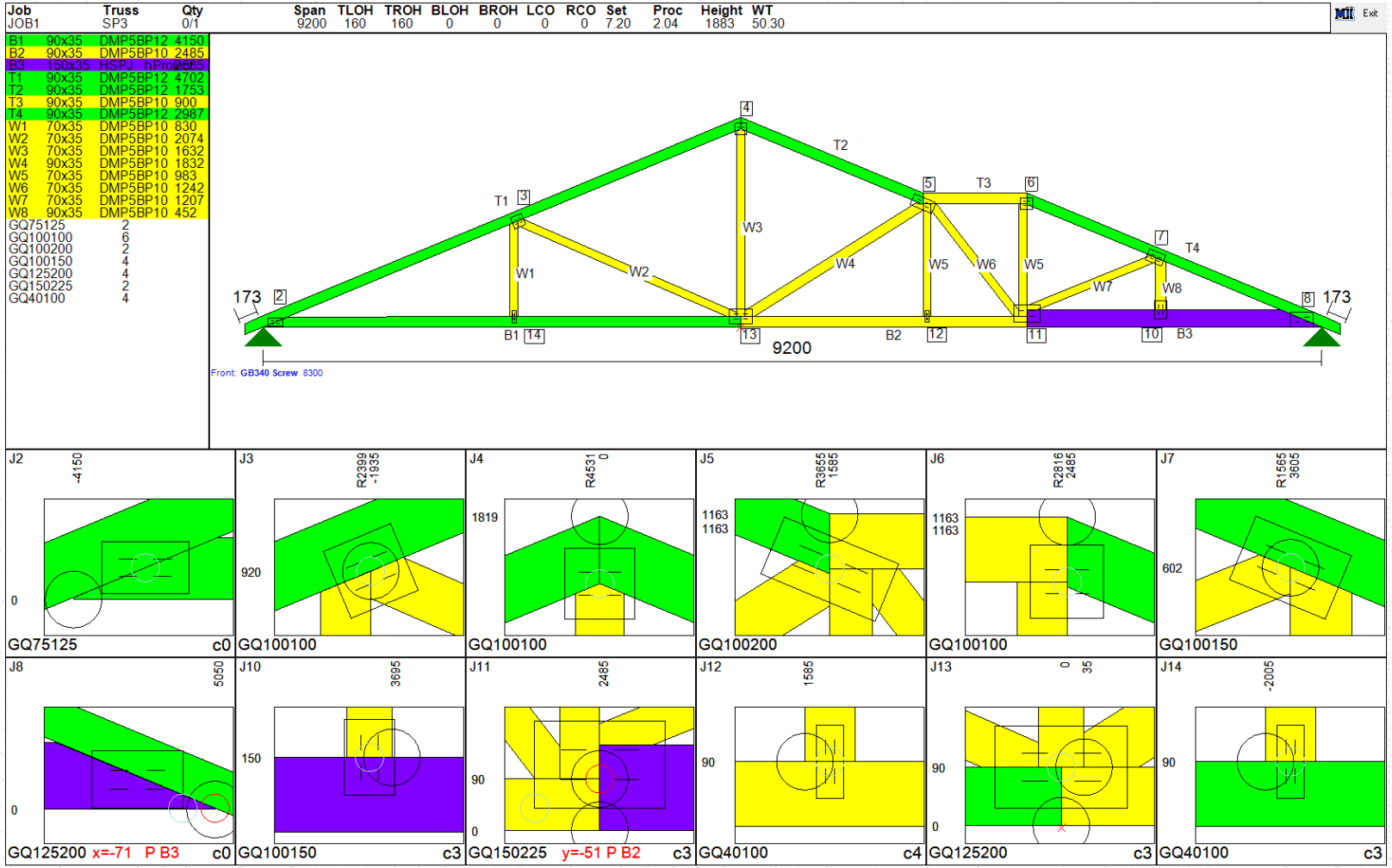




| Load Case | Type | Distribution | Chord | Load Direction | Direction | Begin | End | Value 1 | Value 2 | Panels |
|---|---|---|---|---|---|---|---|---|---|---|
| 1: Strength: 1) 1.35G | Dead | Uniform | Top | Down | X | -600 mm | 6320 mm | 0.031 kN/m | 0.031 kN/m | Filter |
| 1: Strength: 1) 1.35G | Dead | Uniform | Top | Down | X | -600 mm | 2860 mm | 0.085 kN/m | 0.085 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Uniform | Top | Down | X | -600 mm | 1960 mm | 0.086 kN/m | 0.086 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Uniform | Top | Down | X | -600 mm | 0 mm | 0.122 kN/m | 0.122 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Uniform | Bottom | Down | X | 0 mm | 5720 mm | 0.031 kN/m | 0.031 kN/m | Filter |
| 1: Strength: 1) 1.35G | Dead | Uniform | Bottom | Down | X | 90 mm | 5630 mm | 0.081 kN/m | 0.081 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Uniform | Bottom | Down | X | 90 mm | 1960 mm | 0.081 kN/m | 0.081 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Trapez. | Top | Down | X | 1960 mm | 2860 mm | 0.086 kN/m | 0.000 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Force | Bottom | Down | X | 1960 mm | 1960 mm | 0.680 | | J12(Cond01) |
| 1: Strength: 1) 1.35G | Dead | Force | Top | Down | X | 2837 mm | 2837 mm | 0.051 | | HB5(Cond01) |
| 1: Strength: 1) 1.35G | Dead | Uniform | Top | Down | X | 2860 mm | 6320 mm | 0.085 kN/m | 0.085 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Force | Top | Down | X | 2860 mm | 2860 mm | 0.251 | | J11(Cond01) |
| 1: Strength: 1) 1.35G | Dead | Force | Bottom | Down | X | 2860 mm | 2860 mm | 0.254 | | J11(Cond01) |
| 1: Strength: 1) 1.35G | Dead | Trapez. | Top | Up | X | 2860 mm | 3760 mm | 0.000 kN/m | -0.086 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Force | Top | Down | X | 2883 mm | 2883 mm | 0.051 | | HB5(Cond02) |
| 1: Strength: 1) 1.35G | Dead | Uniform | Top | Down | X | 3760 mm | 6320 mm | 0.086 kN/m | 0.086 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Uniform | Bottom | Down | X | 3760 mm | 5630 mm | 0.081 kN/m | 0.081 kN/m | |
| 1: Strength: 1) 1.35G | Dead | Force | Bottom | Down | X | 3760 mm | 3760 mm | 0.680 | | J12(Cond02) |
| 1: Strength: 1) 1.35G | Dead | Uniform | Top | Down | X | 5720 mm | 6320 mm | 0.122 kN/m | 0.122 kN/m | |

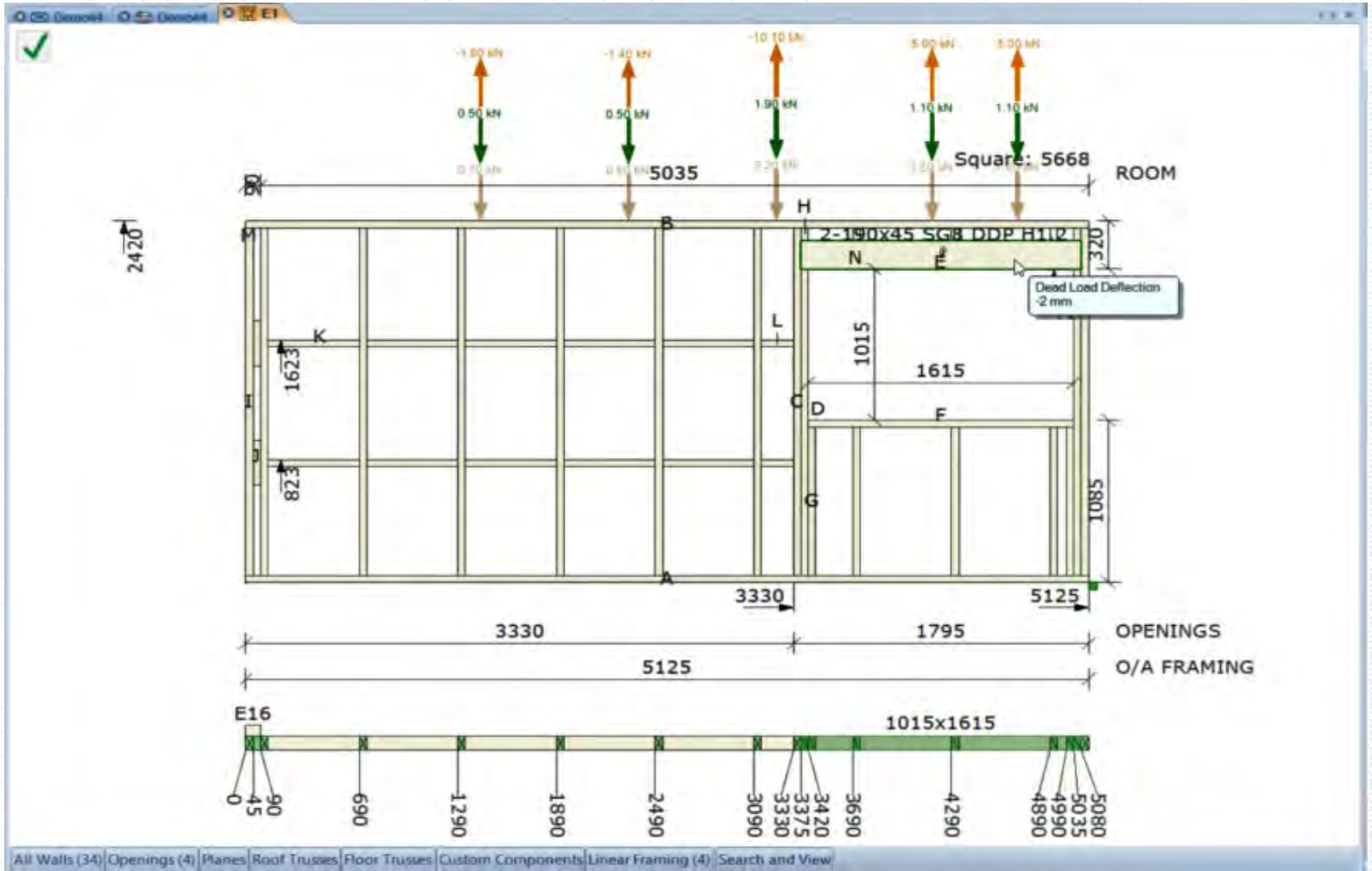
# New Technology – SAPPHIRE Software

- Truss Shop Drawing



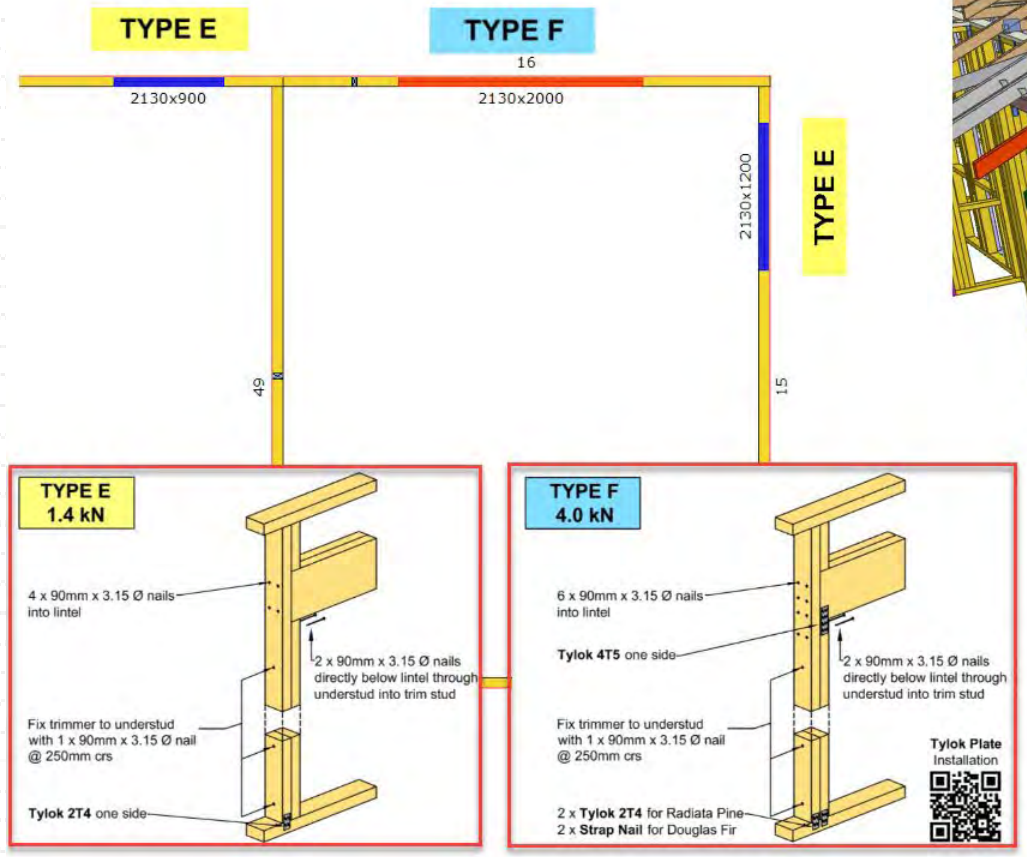
# New Technology – SAPPHIRE Software

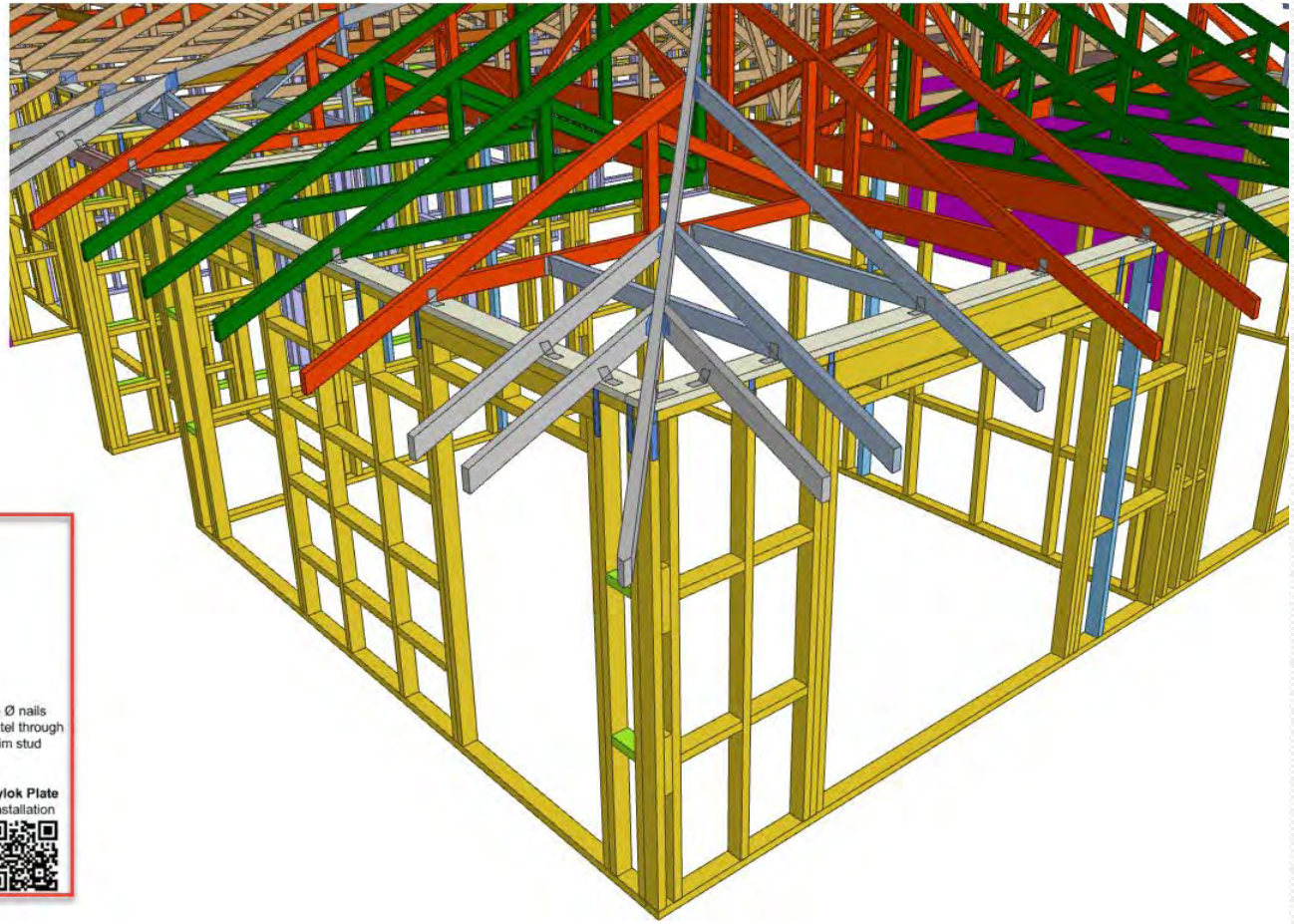
- Vertical & Uplift Loads to Walls



# New Technology – SAPPHIRE Software

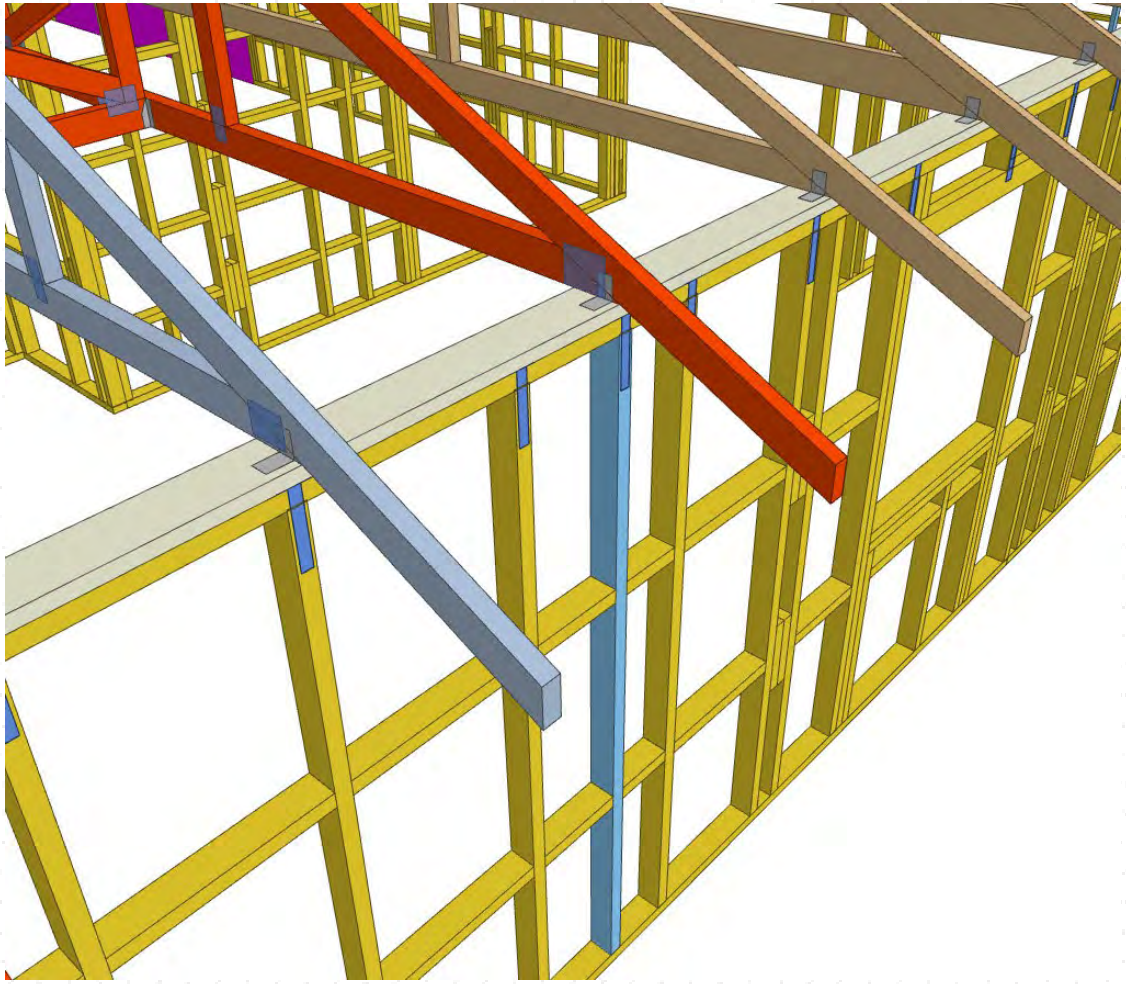
- Lintel Design & Fixings



# New Technology – SAPPHIRE Software

- Automatically adds Critical Stud (in blue) to wall under Girder Truss



# New Product – TPS 140

- Top Plate Stiffener TPS 140 for 140mm Walls
- Strengthening  Top Plate and Stud
- Fix with 16 x Type 17 – 14g x 35mm screws per bracket
- For 80mm and 110mm dia. Pipes
- Currently not a stock item
- Order as a Lumberlok Special bracket TPS 140

# New Product – STUDLOK SCREWS

- Started with SL125 (Yellow) for fabricators only
- Now available in merchant shops – SL80 (White), SL125 (Green) & SL170 (Blue)

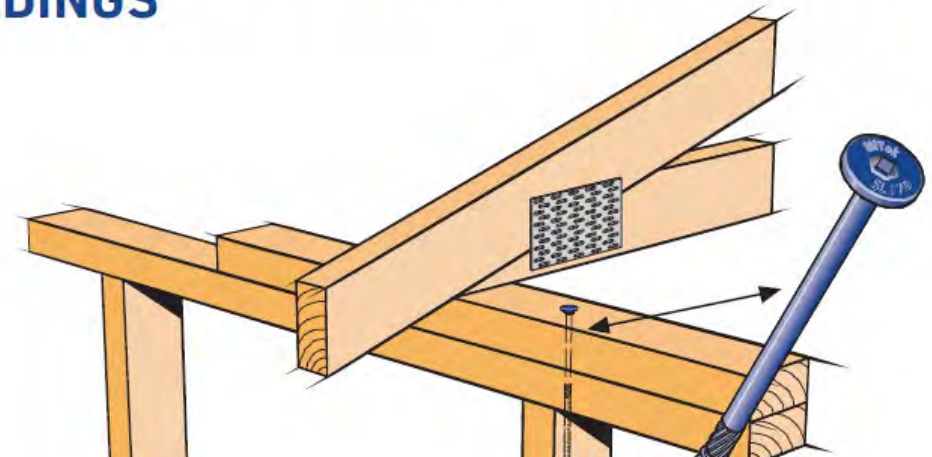
# New Product – STUDLOK SCREWS

We have issued the following brochures:

- Stud-Lok Top Plate Fixing
- Stud-Lok Lintel Fixing Options
- Stud-Lok Stringer to Stud Fixing

## STUD-LOK SL170 (BLUE) TOP PLATE FIXING

### PROVIDES A SOLUTION FOR TOP PLATE TO STUD FIXINGS FOR RESIDENTIAL TIMBER FRAME BUILDINGS



## STUD-LOK LINTEL FIXING OPTIONS FOR ON-SITE

### ALTERNATIVE TO TABLE 8.14 & FIGURE 8.12 NZS 3604:2011

- All fixings are designed for vertical loads only. Dead loads include the roof weight and standard ceiling weight of 0.20kPa.
- These fixings assume the correct choice of rafter/truss to top place connections have been made.
- All fixings assume bottom plate thickness of 45mm maximum
- Wall framing arrangements under girder trusses are not covered in this schedule
- All timber selections are as per NZS 3604:2011.

Lintel span dimension point

## STUD-LOK STRINGER TO STUD FIXING SCHEDULE

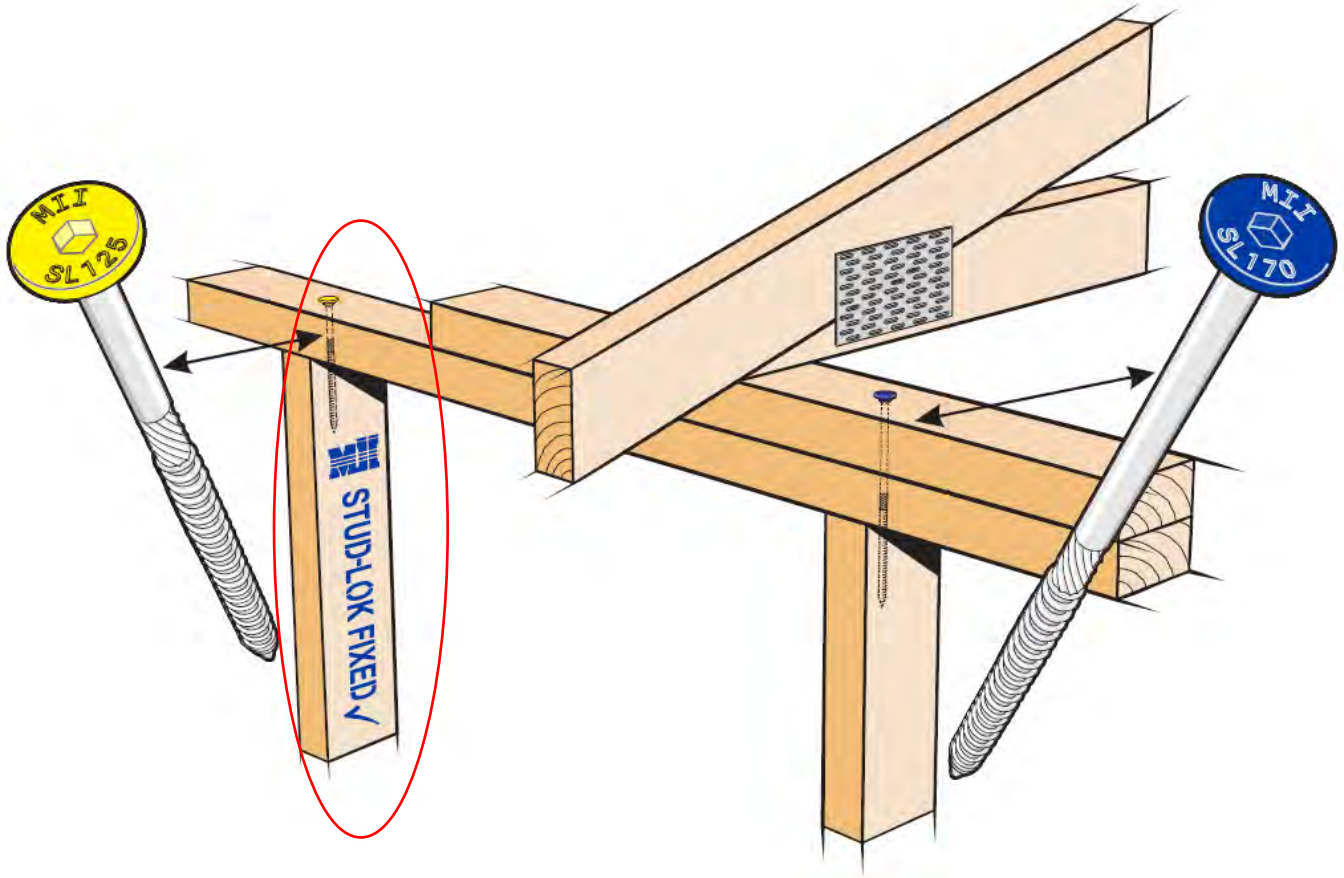
### LOADINGS AND DETAILS FOR INSTALLING STRINGERS TO TIMBER STUDS

- Timber stringers must be SG8 Radiata pine only
- Stringer height is measured from base of wall or from floor level
- Stud size and spacing indicated are minimum requirements
- Assume supported trusses are at 900mm centres
- Refer to Truss Fixing Report for maximum Truss Characteristic Reactions (Up or Down)
- Select Stringer Type Characteristics Strength > or = maximum Truss Characteristic Reaction

# New Product – STUDLOK SCREWS

If fabricators fixed wall frames with Stud-Lok:

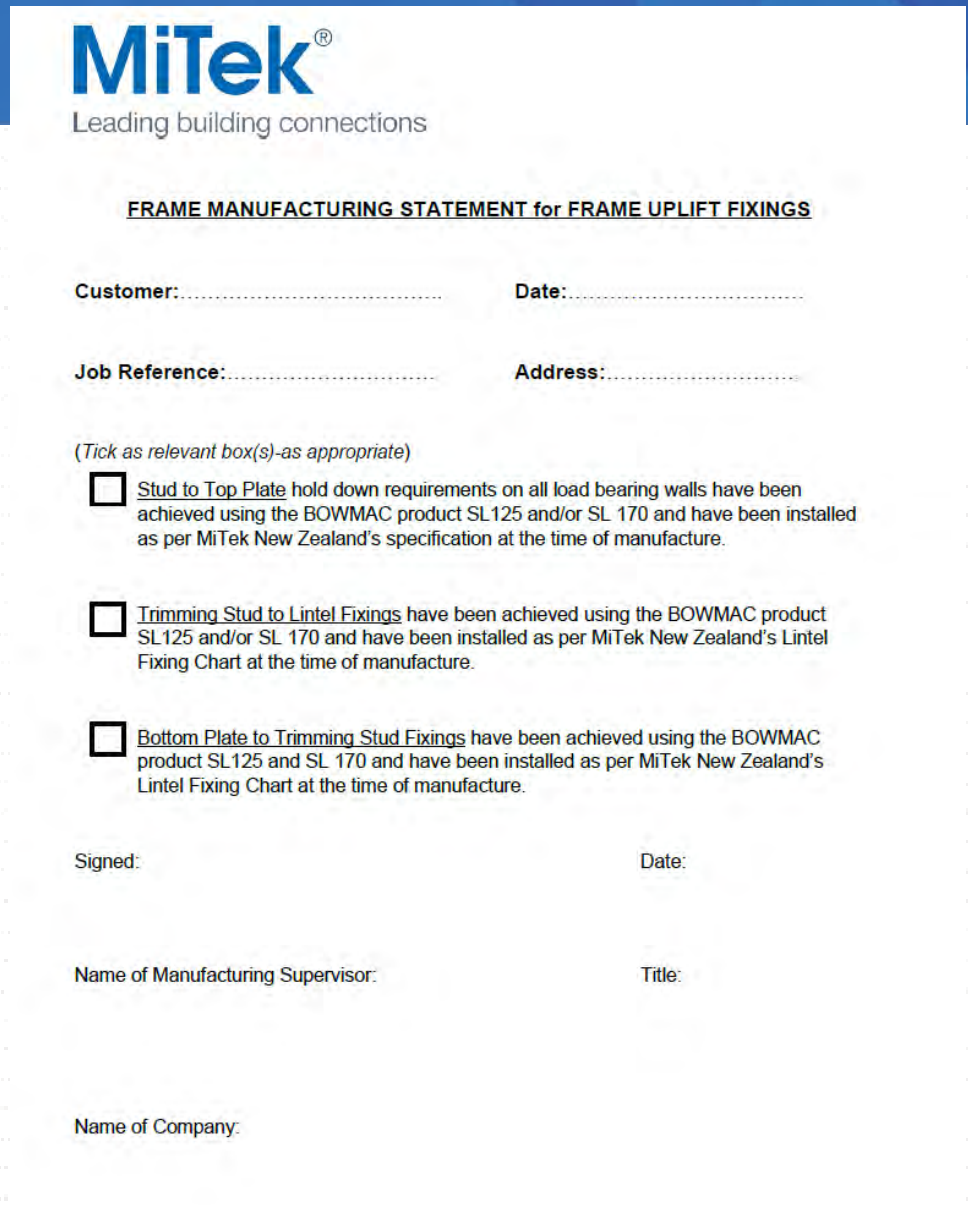
- Some studs should be stenciled with “STUD-LOK FIXED”



# New Product – STUDLOK SCREWS

If fabricators fixed wall frames with Stud-Lok:

- Some studs should be stenciled with “STUD-LOK FIXED”
- Provide a Manufacturing Statement with the relevant items ticked



MiTek®
Leading building connections

**FRAME MANUFACTURING STATEMENT for FRAME UPLIFT FIXINGS**

**Customer:**..... **Date:**.....

**Job Reference:**..... **Address:**.....

(*Tick as relevant box(s)-as appropriate*)

☐ Stud to Top Plate hold down requirements on all load bearing walls have been achieved using the BOWMAC product SL125 and/or SL 170 and have been installed as per MiTek New Zealand's specification at the time of manufacture.

☐ Trimming Stud to Lintel Fixings have been achieved using the BOWMAC product SL125 and/or SL 170 and have been installed as per MiTek New Zealand's Lintel Fixing Chart at the time of manufacture.

☐ Bottom Plate to Trimming Stud Fixings have been achieved using the BOWMAC product SL125 and SL 170 and have been installed as per MiTek New Zealand's Lintel Fixing Chart at the time of manufacture.

Signed: Date:

Name of Manufacturing Supervisor: Title:

Name of Company:

# NEW PRODUCT:
# Z4 CONTINUOUS TIE-DOWN SYSTEM

# MULTI-STOREY BUILDINGS IN NZ

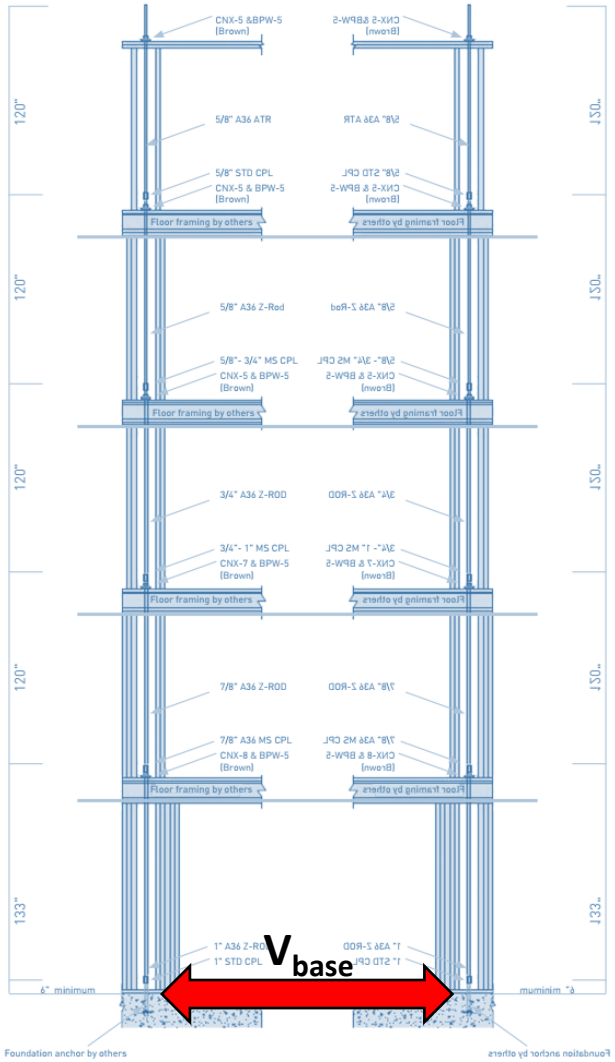
TIMBER

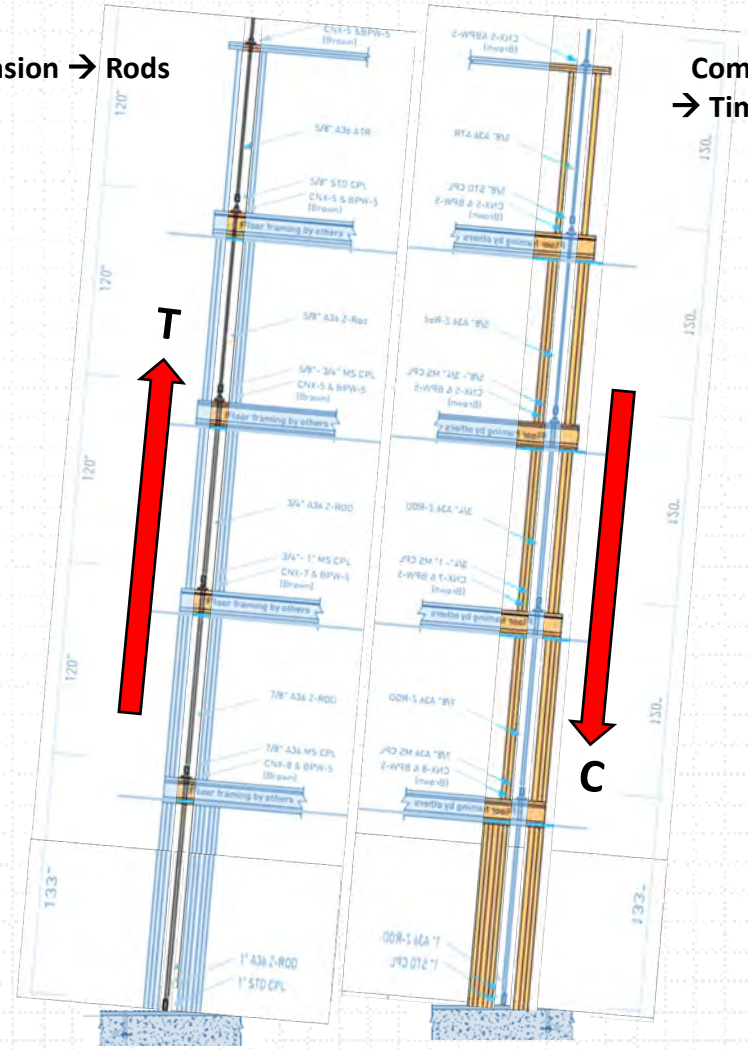
# Multi-Storey Buildings in NZ

>3 Storeys

Outside the scope of NZS3604 (CURRENTLY!)

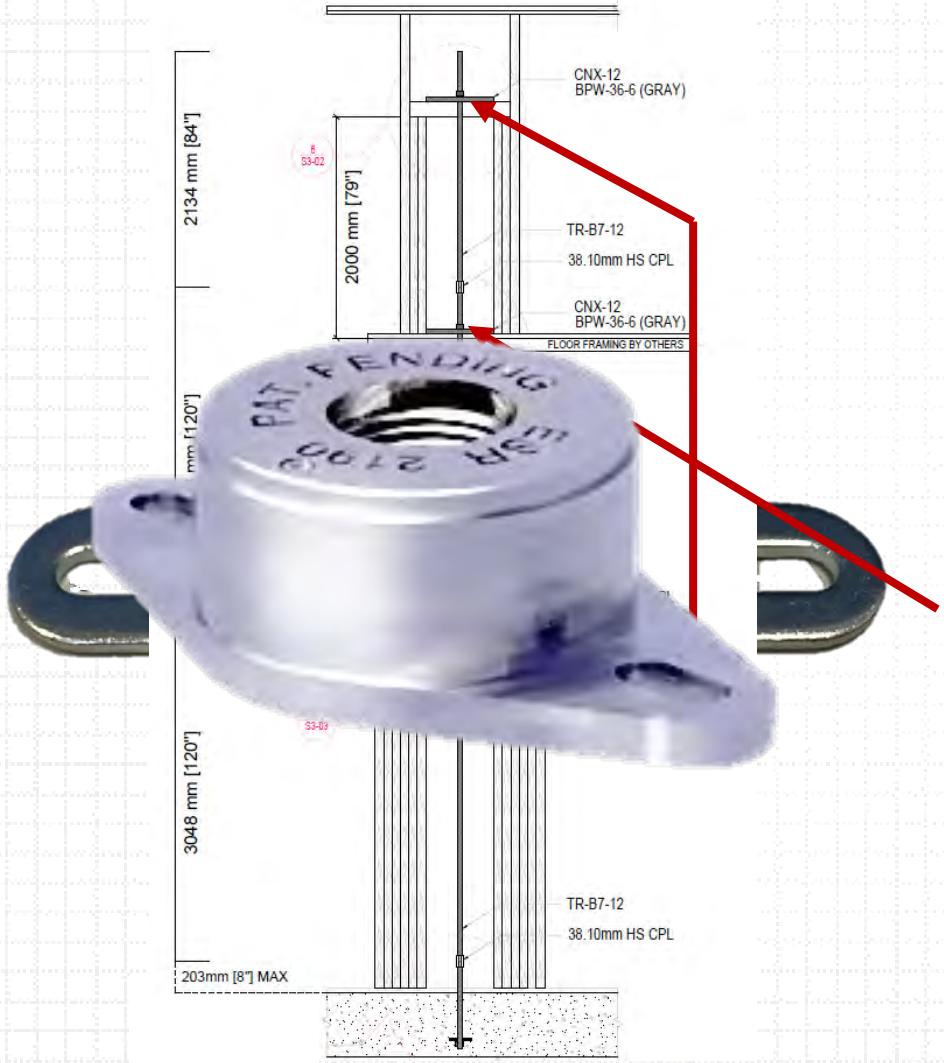
# SEISMIC and WIND FORCES



# SHRINKAGE COMPENSATING DEVICE

## The Solution




- A Ratcheting Device
- Move Downward Freely But Not Upwards
- Call the Omega Nut
- Omega Nut Sits at Every Floor Level
- Omega Nut Sizes for All Rod Diameters (3/8” to 1½“ 9.5mm to 38mm)
- Simple Design Philosophy

# Z4 CONTINUOUS TIE-DOWN SYSTEM

All Threaded Rod

Coupler

**Omega Nut**

Bearing Plate Washer

# FAQs

Q1: Can Bowmac Screw Bolt M10 x 140mm and Gib HandiBrac be used on internal 85mm thick rib raft/ waffle slab?
A: Yes, we have carried out tests with Firth and achieved withdrawal load of 19.76KN (>15KN) adjusted for 20 MPa conc.

Q2: Can Bowmac Screw Bolt be used with 90mm bottom plate and insulated edge slab?
A : Yes. BRANZ has tested with MaxRaft and Firth Hot Edge slabs.

Q3: Roof trusses with 2m cantilevers are outside NZS 3604. Therefore, walls supporting these trusses require SED.
A: No. If the “loaded dimension” is not more than 6m, then walls are as per NZS 3604. All roof trusses are SED. For e.g. if truss span is 8m with 2m cantilever, the loaded dimension is then 6m. So wall studs are as per NZS 3604.

MiTek®

QUESTIONS?

EMAIL to

design.miteknz@mii.com