

SubBase100 Deck System

Technical Manual



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1. PRODUCER STATEMENT

PRODUCER STATEMENT FOR SUBBASE100 DECK SYSTEM

ISSUED BY: **Thijs Drupsteen**

TO: **SubBase Building Technologies Ltd**

IN RESPECT OF: SubBase100 Deck System

This producer statement covers the SubBase100 pile support with 90mm² H5 piles & Alongside brace.

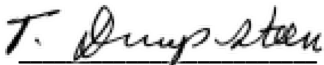
The SubBase100 deck pile & Alongside brace designs computed Thijs Drupsteen Engineer are prepared using sound and widely accepted engineering principles, and in accordance with compliance documents of the New Zealand Building Code and Verification Method B1/VM1, to satisfy the requirements of Clauses B1 and B2 of the New Zealand Building Code.

On behalf of SubBase Building Technologies Limited, and subject to:

- i) All proprietary products specified meeting their performance specification requirements.
- ii) Soil having 300kPa minimum ultimate bearing.
- iii) Maximum pile height of 2.1m out of ground.
- iv) Correct concrete strength of 17.5MPa with 100mm slump.
- v) Correct timber sizes, grading and preservation treatment as per the SubBase100 Deck System drawings #1-#6.
- v) Correct installation of all cleats, joist hangers, nail plates and fasteners as per the SubBase100 Deck System drawings #1-#6.

I believe on reasonable grounds that the SubBase 100 deck piles & Alongside brace if constructed in accordance with the SubBase100 Deck System drawings #1-#5, will comply with the relevant provisions of the New Zealand Building Code.

I hold a current policy of Professional Indemnity Insurance for no less than \$500,000.



Tuesday 1st December 2020

Thijs Drupsteen BE, CP Eng 6152

Int PE, Member, Engineers N.Z.

2. PRODUCT INFORMATION

Product Description of Intended Use • SubBase100 pile/post supports are injection-moulded using some recycled plastic. • They are designed to provide temporary support for timber piles & bearers up to 300kg in their footing holes prior to concrete being added. • **Product Features of the SubBase100** • SubBase100 is both light and easy to handle. • They are stackable to take up minimal space. • They support the pile/post building code requirement that timber/posts have 100mm of concrete under them. • They assist the builder to prop in place the pile/post in the correct location in the footing hole prior to adding concrete. • Bearers can be added before the footing holes are filled with concrete. • Provided concrete with the correct slump (17.5MPa, 100 slump) has been used, the builder can carry on with the construction of the subfloor after 6 hours has elapsed. • SubBase 100 fitted with temporary braces can have further subfloor components added, i.e. permanent braces and bearers (not walls) with care 4 hours after concrete has been added to the footing. • Activity that places additional side loads (i.e. leaning ladders against pile/post, hammer nailing, boring holes, etc.) that are likely to move the pile/post are not to be undertaken until 4 hours has lapsed after footing holes have been filled with concrete. • SubBase devices are to be used by Licensed Building Practitioners or building workers working under their supervision. • **Building Code Compliance Information** • NZBC B1/AS1 • NZBC B2/AS1 • NZS 3604:2011; As per clauses 6.4.5.6, 6.4.5.7 and figure 6.2(B) Timber piles - 100mm minimum concrete under piles. • **Branz Appraisal** • SubBase100 and SubBase125 have been appraised by BRANZ. • **Accessories** • There are 4 holes in the base of each device for fixing to the pile/post. Recommended nails are 30x2.8mm, and screws can be 8g x25mm. These are not supplied with the products. • A post and pipe level is a great tool to use with these products. Examples are; Fuller 001-1260, Empire T720. • **Site Requirements** • The foundation for the building has to be on solid ground with an ultimate bearing capacity of 300kPa. • The bottom of the footing hole has to be cleared of loose material. • The bottom of the footing hole must be near level (within 5mm). • **Health and Safety** • Use correct lifting technique when picking up heavy objects; bend the knees and keep the back straight. • Determine a safe route before picking up heavy objects. Avoid walking into and over obstacles, especially dug footing holes. •

3. MATERIALS

Concrete

Concrete for pile footings is to 17.5MPa strength with 100mm slump.

Timber

All timber specified in this manual is SG8 grade.

Bearers & joists more than 300mm to FGL can be H3.2 treated, bearers & joists closer than 300mm to FGL must be H4 treated.

90x70 SG8 brace timber is to be H4 treated.

90mm² SG8 piles are to be H5 treated.

Use Lumberlok 12kN pile fixing kits on each anchor pile & adjacent joists.

See drawing #6.

Hardware

Hardware specified in this manual is to be Grade 304 stainless steel.

Product nails mentioned for fixing joint hangers, multi grips, CT160 cleats etc. are to be Lumberlok 45x3.15mm stainless steel annular grooved nails.

Product nails mentioned for fixing Nailon plates are to be Lumberlok 45x3.3mm stainless steel annular grooved nails.

Nails mentioned for fixing braces at mid-point are to be Lumberlok 90x4mm annular grooved nails.

Bolts mentioned are to be M12 x Grade 304 stainless steel engineering bolts, to be fitted with Grade 304 stainless steel 50x50x3mm thick washers at each end.

Stainless steel Grade 304 12mm diameter all thread can be used with Grade 304 stainless steel washers and 12mm diameter nuts at each end.

4. FOOTING SIZES

All ordinary pile footings are to be 300mm² x 300mm deep.

All brace pile footings are to be 300mm² x 450mm deep.

All anchor pile footings are to be 300mm² x 900mm deep.

5. BRACING THE DECK

Decks less than 900mm from solid ground do **not** require bracing

Decks with stringers and/or joists which are fixed to a building on one or more sides and which project no more than 2m from the building do **not** require subfloor bracing.

Decks which do project more than 2m from a building and/or standalone decks **do** require bracing at the rate of 7.5units per square metre (m²) of deck area, adjusted for soil types by using the multiplication factors based on earthquake zones.

Deck site must have solid ground, i.e. Minimum 300kPa ultimate bearing capacity.

Flow chart

1. Find your soil type
2. Find your earthquake zone
3. Work out the area of your deck
4. Multiply bracing demand (7.5units by area of deck (m²)) by appropriate multiplication factor based on earthquake zone and soil type

Soil Types

Generally site soil types fit into five categories;

- | | |
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| A. Strong rock | D. Deep or soft soil sites |
| B. Rock | E. Very soft soil types |
| C. Shallow soil sites | |

Bracing demand example:

To build a deck 3.5m x 6m in a shallow soil site in Earthquake Zone 2

Bracing demand = Area x Units required x C soils Multiplication Factor Zone 2
= 3.5x6x7.5x0.6 = 94.5 bracing units required.

To satisfy this demand two braces are available:

Alongside brace supplies 86units and the anchor pile supplies 38units

Therefore the 94.5unit demand can be satisfied with either;

1x anchor piles and 1x Alongside brace (38+86=124units)

3x anchor piles (3x38=114units) or

2x alongside braces (2x86=172units)

Note anchor piles can only be used if the highest connection is 600mm max from ground level.

Braces:

Alongside brace: The Alongside brace is 90x70 SG8 H4 timber fixed on one side of two piles each with 2-Multigrips at each end.

Fix each Multigrip with 6-nails into each flange (12-nails total per Multigrip). Fix 2x 160x110x1mm Nailon plates each side of Alongside brace pile & bearer junction with 7-product nails into pile & bearer (14-30x3.15mm nails total per Nailon plate). Fix 4-CT160 cleats on each adjacent joist with 3-nails into bearer & joist (6-30x3.15mm nails per CT160).

Brace is to be no closer than 150mm to FGL.

Angle of brace is to be between 10° and 45°.

See drawing #5.

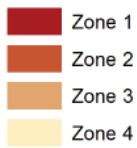
Anchor piles: Anchor piles are 90mm² SG8 H5 timber embedded 800mm in a 300mm² x 900mm deep 17.5MPa concrete footings.

Use Lumberlok 12kN pile fixing kits on each anchor pile and adjacent joists.

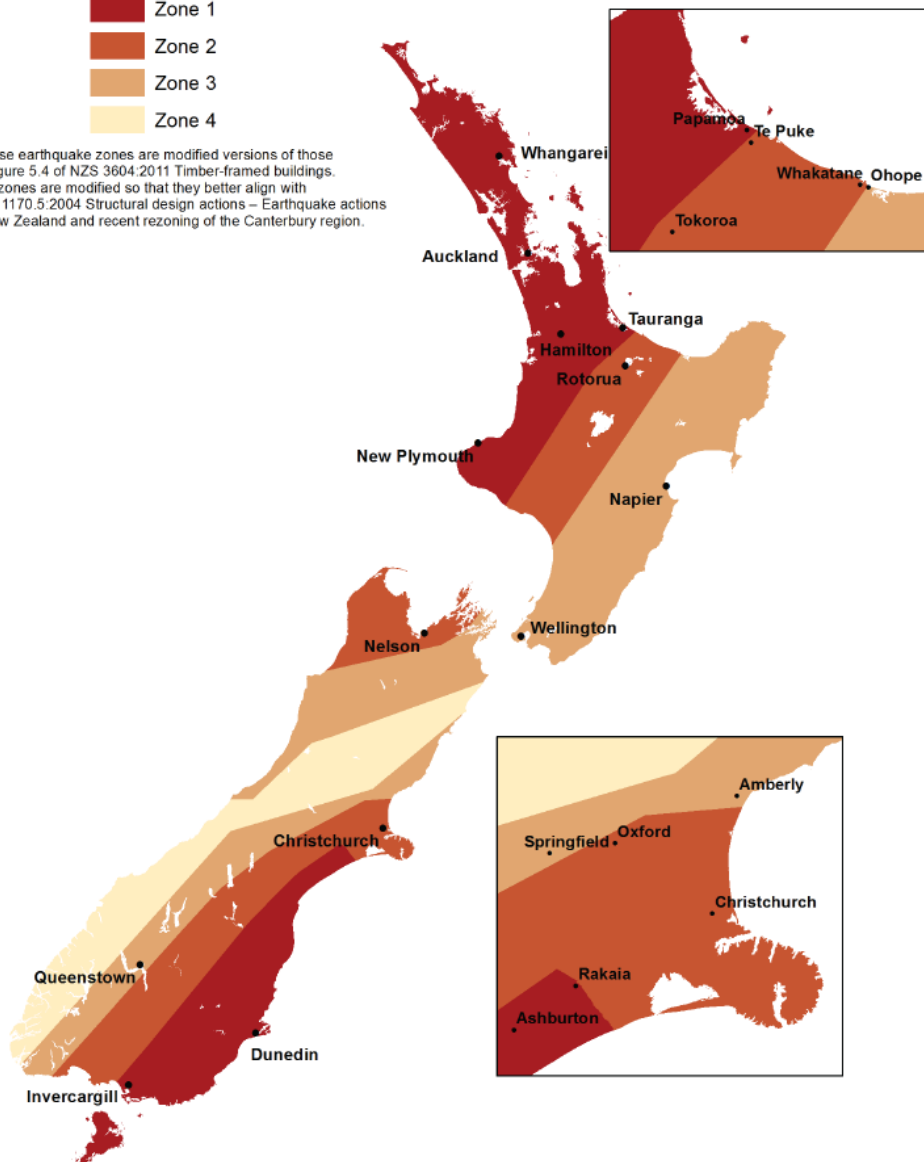
See drawing #6.

6. EARTHQUAKE ZONES

BRANZ Earthquake Zones*



*These earthquake zones are modified versions of those in Figure 5.4 of NZS 3604:2011 Timber-framed buildings. The zones are modified so that they better align with NZS 1170.5:2004 Structural design actions – Earthquake actions – New Zealand and recent rezoning of the Canterbury region.



Soil Class	EQ Zone			
	1	2	3	4
A & B	0.3	0.5	0.6	0.9
C	0.4	0.6	0.7	1.1
D & E	0.5	0.8	1.0	1.5

7. SPAN TABLES

Bearers

<u>Bearer Spans</u>	<u>Loaded Dimension*</u>	<u>Bearer Size</u>
1.3m	1.2m	2-90x45 SG8 H3.2*
	3.0m	2-140x45 SG8 H3.2*
	4.5m	2-190x45 SG8 H3.2
1.6m	0.7m	2-90x45 SG8 H3.2*
	1.8m	2-140x45 SG8 H3.2*
	2.8m	2-190x45 SG8 H3.2
2.m	1.2m	2-140x45 SG8 H3.2*
	2.m	2-190x45 SG8 H3.2

Note: Bearers marked with an * are not suitable for fixing edge barriers to. 1m high edge barriers can be fixed to the other bearers provided the fixings from Mitek Deck Joist Fixing alternative solution 09/2015 are used between joists and boundary joists.

Edge Bearers for 900mm high handrail balusters in footings

Spans	Loaded Dimension*	Edge bearers
1.1m	1.2m	140x45 SG8 H3.2
1.1m	1.7m	190x45 SG8 H3.2
1.1m	2.15m	240x45 SG8 H3.2
1.1m	2.6m	290x45 SG8 H3.2

* Loaded Dimension is half the distance between bearers. To work out the Loaded Dimension where there are cantilevered joists, add the cantilever distance to half the distance between bearers. Please note all measurements between bearers are to be from centre line to centre line.

Joist spans	Centres		
	400mm	450mm	600mm
90x45 SG8 H3.2	1.6m	1.5m	1.6m
140x45 SG8 H3.2	2.4m	2.35m	2.05m
190x45 SG8 H3.2	3.4m	3.2m	2.75m
240x45 SG8 H3.2	4.3m	4.05m	3.5m
290x45 SG8 H3.2	5.2m	4.9m	4.2m

Note: spans may be increased by 10% for joists continuous over >two spans.

Cantilevered Joists	Max Cantilever		
	Joist Centres		
Size	400mm	450mm	600mm
90x45 SG8 H3.2	700mm	650mm	550mm
140x45 SG8 H3.2	1.15m	1.10m	900mm
190x45 SG8 H3.2	1.60m	1.50m	1.30m
240x45 SG8 H3.2	2.05m	1.90m	1.65m
290x45 SG8 H3.2	2.50m	2.30m	2.00m

8. INSTRUCTIONS



Mark out building outlines & bearer lines with strings. Set up profiles to underside of bearer height, adjust for square.



Mark out pile locations & excavate footing holes to correct size & depth.



Make a measure stick up by fixing a length of 100x50 to a SubBase. Place in footing hole to check the bottom of the footing hole is level and then measure from the SubBase 100 Platform to the stringline. Add on 2mm per metre for settling.



Plumb piles up in their correct location, fix temporary braces to the end piles in each line and attach to pegs set into the ground.

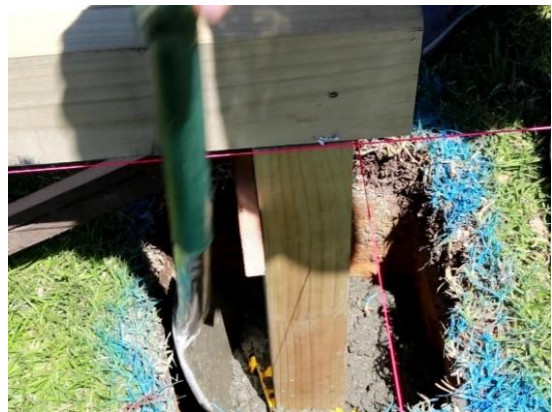
Cut the pile to length. Add bevel cuts for hardware if necessary.



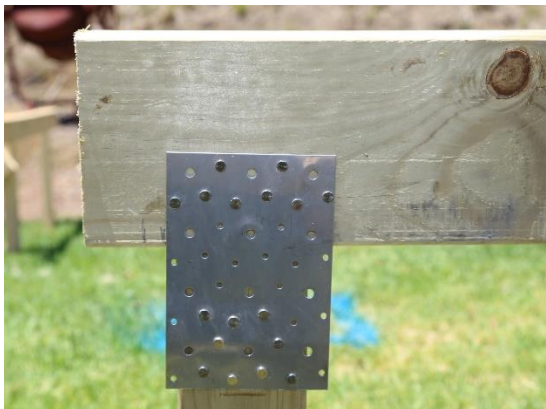
Measure the pile spacings and cut bearers to length, taking care to not have joins on adjacent piles.



Place bearers on piles and tack in place with skew nails. Straighten bearer lines and prop in place with temporary braces attached to pegs set in the ground.



Begin filling holes with concrete taking care not to disturb the SubBases. When SubBase is covered rod the concrete with a rod or spade to ensure there are no air gaps under the SubBases.



Complete filling the footing holes up with concrete and after a minimum of four hours add hardware.
Brace & anchor piles: 160x110x1mm s/steel
 Nail on plate with 8-30x3.15mm s/steel product nails into bearer & pile & 2-100x4mm s/steel skew nails (not shown)



Ordinary pile: 2-s/steel 'U' wire dogs & 2-100x4mm s/steel skew nails (not shown)

