FAR 3580

Assessment of a Non Load Bearing Horizontal and Vertical Orientated Speedpanel Wall with Increased Height and Width Variations

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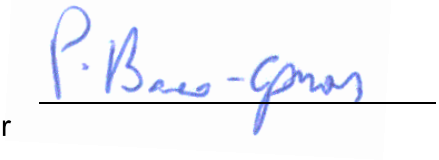

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Assessment of a Non Load Bearing Horizontal and Vertical Orientated Speedpanel Wall with Increased Width and Height Variations

1. CLIENT

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2. INTRODUCTION

This report gives BRANZ's assessment of the fire resistance of the Speedpanel non-loadbearing, pre-cast, horizontal and vertical panel orientated wall with height increase to 6,000 mm and increase in width to 4,500 mm. The assessment considers that the minimum thickness of the galvanised steel panel sheath to be at least 0.44 mm base metal thickness (BMT).

Assessment of the walls interfacing detail (as highlighted in Figure 1 and Figure 2) using a galvanised steel C-track or steel angle with a Speedpannel® wall will also be covered by this assessment.

3. BACKGROUND

3.1 BWA Fire Resistance Test Report 2257600.4

In BWA fire resistance test 2257600.4 the test specimen consisted of a non-loadbearing, Speedwall® panel wall nominally 3,000 mm high by 3,000 mm wide which comprised interlocking panels (tongue and groove), each 285 mm wide x 78 mm thick, of a light weight concrete core with galvanised steel sheathing. Steel C-channels, 54 mm x 83 mm x 54 mm x 1.19 mm thick were fixed to all perimeter edges of the Speedpanel wall.

The perimeter channels were fixed to the specimen concrete frame at the vertical sides but not fixed to the specimen frame top or bottom (i.e. the top and bottom C- track were free edges). The vertical C-channels were fixed to the frame with M8 masonry anchors spaced at 450 mm centres.

The horizontally aligned panels were fixed to the C-Track on the vertical edges at every second panel join at 500 mm centres on the exposed and unexposed face using 35 mm long self tapping screws. Both the top and bottom panels were fixed to the top and bottom C-track at 450 mm centres with 35 mm long self tapping screws.

Additional fixings, using 35 mm long self tapping screws, were located on the first and second horizontal panel joint (from the bottom) at 250 mm and 500 mm centres, respectively.

The channels were sealed to the specimen frame and to the panels at the following locations using Premium Flex Fyreseal acrylic sealant (from the bottom up):

Wall Location	Unexposed Side	Exposed Side
Sides of the Bottom Quarter	No	Yes
Sides of the Second Quarter	Yes	No
Sides of the Top Half	Yes	Yes
Head of the Perimeter Track	Yes	Yes

Nullifire S707-120 Intumescent paint was applied to the exposed and unexposed inside of the C-track located at the east side upper half and extended to the east side half of the head track. No intumescent paint was applied to the west side or lower half of the east side.

A 25 mm clearance gap was provided between the top edge of the panels and the specimen frame, and a 80 mm gap was provided between the specimen frame holder at the bottom. A 10 mm expansion gap was provided at the sides between the panels and side C-track.

The specimen was tested for a duration of 242 minutes in accordance with AS 1530.4-2005 and achieved fire resistance of 128 minutes integrity due to flaming of a cotton pad at a horizontal join in the middle of the upper half of the wall.

After 23 minutes an insulation failure occurred when the temperature recorded on the east side of the bottom quarter channel exceeded the test criterion of 180°C temperature rise (sealant on the exposed side only).

The temperature rise around the perimeter C-track of the wall varied from 23 minutes to 114 minutes and was depended on the application of intumescent paint and/or acrylic sealant.

The temperature rise of the panel exceeded the test criterion of a temperature rise of 180°C above ambient at 15 mm below a horizontal join in the top half of the wall (approximately the mid point of the top half) after 117 minutes.

Full details of the construction of the wall and the results achieved are given in BWA fire resistance test report 2257600.4, dated 25 June 2008.

3.2 BWA Fire Resistance Test Report 2286900

In BWA fire resistance test 2286900 the test specimen consisted of a load bearing, Speedwall® panel wall nominally 3,000 mm high by 2,790 mm wide which comprised vertically aligned interlocking panels (tongue and groove), each 285 mm wide x 78 mm thick, of a light weight concrete core with galvanised steel sheathing.

The load was applied to the wall from the base at 6 points every 500 mm across for the duration of the test. The average load applied at each point was 2.0 kN (4.3 kN/m). The load was applied to simulate a 6,000 mm high panel wall.

The top and bottom perimeters of the wall were fixed to the top and bottom of the test specimen frame while the east and west vertical sides remained as a “free edge” (unfixed to the specimen frame).

The “free edge” vertical sides of the wall were capped with a steel C-track filled with a ceramic fibre blanket (Kaowool). The dimensions of the galvanised steel C-track on the east and west side was 17 x 60 x 17 mm x 0.6 mm thick and 50 x 59 x 50 mm x 0.6 mm thick, respectively.

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Galvanised steel C-channels, 58 mm x 83 mm x 58 mm x 1.2 mm thick were fixed to the top and bottom perimeter edges of the Speedpanel wall.

The perimeter channels at the top and bottom were fixed to the furnace concrete specimen frame with masonry anchors (size not reported) spaced at 450 mm centres.

The vertically aligned panels were fixed to the C-Track on the top and bottom at 250 mm centres and fixed to each other (at the tongue and groove overlap) along the horizontal centre line of the wall with 15 mm long self tapping screws. The end caps on both vertical sides (free edges) were fixed to the panel ends with three 15 mm self tapping screws spaced evenly and vertically at the top and bottom and mid way of the track. The panel and track screw fixing locations were identical on both the unexposed and exposed side.

All gaps on the unexposed and exposed side of the construction were filled with fire rated acrylic sealant (the brand was not specified in the test report).

Two 50 x 50 mm x 6 mm thick mild steel angles (MSAs) were welded together and located underneath the bottom C-track to provide support for the wall system when under load. Furthermore, three vertical MSAs were located equi-spaced at the base of the C-track on the exposed and unexposed side to prevent lateral movement of the C-track when under load.

A 10 mm clearance gap was provided between the top C-track and side capping and a 35 mm clearance gap between the bottom C-track and side capping. A 10 mm expansion gap was provided between the top C-track and the top of the panels.

The specimen was tested for a duration of 144 minutes in accordance with AS 1530.4-2005 and achieved fire resistance of 144 minutes structural adequacy (no failure for the duration of the test), 120 minutes integrity due to flaming of the sealant at the interface of the top C-track and vertical panel and 64 minutes insulation due to the maximum temperature of the top C-track exceeding 180 K above ambient.

The temperature rise of the panel exceeded the test criterion for a maximum temperature rise of 180°K above ambient at 15 mm from the edge of a vertical panel join at approximately the centre of the wall at mid height.

Full details of the construction of the wall and the results achieved are given in BWA fire resistance test report 2286900.5 dated 24 February 2009.

3.3 Branz Fire Resistance Test FR 3569

In BRANZ fire resistance test FR 3569 the test Specimen consisted of a non-loadbearing, Speedwall® panel wall nominally 4,000 mm high by 3,000 mm wide which comprised interlocking panels (tongue and groove), each 286 mm wide x 78 mm thick, of a light weight concrete core with galvanised steel sheathing. Steel C-channels, 60 mm x 80 mm x 60 mm x 1.16 mm thick were fixed to the top, base and left hand perimeter edges of the wall with bolts. The channels were sealed to the specimen frame and to the panels with Bostik Firecaulk fire rated acrylic sealant. The panels were fixed to the channels and to each other with 5 mm diameter x 15 mm long TEK screws. Each panel was fixed to the next at 1,500 mm centres on both sides of the vertical joints.

A 10 mm expansion gap was provided between the top edge of the panels and the specimen frame, and filled with a bead of sealant.

The specimen was tested for a duration of 141 minutes in accordance with AS 1530.4-1997 and achieved a fire resistance of 105 minutes integrity and 72 minutes

Insulation. Insulation failure occurred when the temperature recorded on the head channel exceeded the test criterion of 180°C temperature rise. The temperature rise recorded on this head channel at 120 minutes was 257°C. The temperature rises recorded on the edge channels at the sides of the wall did not exceed the test criterion prior to 120 minutes.

Full details of the construction of the wall and the results achieved are given in BRANZ fire resistance test report FR 3569, dated 21 March 2006.

3.4 Branz Fire Resistance Test FR 3754

In BRANZ fire resistance test FR 3754 the test Specimen consisted of a non-loadbearing, Speedwall® panel wall nominally 3,000 mm high by 3,000 mm wide which comprised interlocking panels (tongue and groove), of a light weight concrete core with galvanised steel sheathing. Steel angles, 64 mm x 55 mm x 1.15 mm thick were fixed to the top, base and left hand perimeter edges of the wall with bolts. The angles were sealed to the specimen frame and the panels with Bostik Firecaulk fire rated acrylic sealant. The panels were fixed to the angles and to each other with Hilti DB7 6 mm diameter fasteners. Each panel was fixed to the next at 1,000 mm centres on both sides of the vertical joints.

A 10 mm expansion gap was provided between the top edge of the panels and the specimen frame, and filled with a bead of sealant. A second set of angles was screw fixed to the unexposed face of the panels at the top, base and left hand side of the with Hilti DB7 fasteners and a bead of sealant was placed between the angles and the panels and specimen frame.

The specimen was tested in accordance with AS 1530.4-1997 and achieved fire resistance of 245 minutes Integrity and 123 minutes Insulation.

Full details of the construction of the wall and the results achieved are given in BRANZ fire resistance test report FR 3754, dated 12 June 2007.

3.5 BRANZ Pilot Fire Resistance Test FP 3904

BRANZ un-reported pilot fire resistance test FP 3904 was carried out on 30 October 2007 at the BRANZ laboratories at Judgeford. The test Specimen consisted of a Speedwall® panel wall nominally 2,200 mm high by 1,000 mm wide, identical to that tested in fire resistance test FR 3754, except it included an alternative head detail consisting of a C-channel and Z-flashing strips to each face. The specimen was tested generally in accordance with AS 1530.4-1997, except it was of reduced size. The flashing detail maintained the Integrity criteria for 132 minutes without failure and the Insulation criteria for 130 minutes.

3.6 BRANZ Assessment Report FAR 3107

In BRANZ assessment report FAR 3107 the fire resistance in accordance with AS 1530.4-1997 of the wall tested in BRANZ fire resistance test FR 3754 with the alternative top edge flashing detail tested in FP 3904 was considered to be at least 240 minutes Integrity and 120 minutes Insulation.

3.7 BRANZ Assessment Report FAR 3525

In BRANZ assessment report FAR 3525 the fire resistance in accordance with AS 1530.4-2005 of the wall tested in Bodycote Warrington fire resistance test report No. 2286900 with the alternative top edge flashing detail highlighted in Figure 1 of FAR 3525 (also highlighted in Exova Waringtonfire assessment report

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EWFA 22551-01, Figure 2) was considered to be at least 120 minutes Integrity and 120 minutes Insulation.

3.8 BRANZ Assessment Report FAR 3575

In BRANZ assessment report FAR 3575 the fire resistance in accordance with AS 1530.4-1997 of the wall tested in BRANZ fire resistance test FR 3754 with the edge detail consisting of channel sections as tested in FR 3569 and with screw fixings at a maximum centre distance of 1,500 mm and a maximum wall dimensions of 4,500 mm high x 3,000 mm wide was considered to be at least 120 minutes Integrity and 60 minutes Insulation.

3.9 BRANZ Assessment Report FAR 3561

In BRANZ assessment report FAR 3561 the fire resistance in accordance with AS 1530.4-1997 of the wall tested in BRANZ fire resistance test FR 3754 was considered to be at least 120 minutes Integrity and 120 minutes Insulation with:

1) the construction as tested in FR 3754 or alternatively the head detail as tested in pilot fire resistance test FP 3904 as detailed in Figure 1 of Assessment Report FAR 3107; and
2) the construction as tested in FR 3754 or alternatively the bottom and side edge detail consisting of channel sections as tested in FR 3569; and
3) the wall having a maximum height of 4,500 mm; and
4) the screws fixing the panels together at the tongue and groove joints are spaced at 1,500 mm maximum.

3.10 BRANZ Assessment Report FAR 3502

In BRANZ assessment report FAR 3502 the fire resistance in accordance with AS 1530.4-2005 of two walls as tested in BRANZ fire resistance test FR 3754 and spaced 1,000 mm apart with a horizontally aligned Speedpanel wall were considered to be at least 120 minutes Integrity and 120 minutes Insulation. The fixing details of the horizontally aligned intermediate Speedpanel wall is detailed in BRANZ assessment report FAR 3502.

3.11 BRANZ Assessment Report FAR 3454

In BRANZ assessment report FAR 3454 the fire resistance in accordance with AS 1530.4-2005 of a Speedpanel wall in BRANZ fire resistance tests FR 3754 and FR 3569 comprising a 90° junction between another Speedpanel wall was considered to be at least 120 minutes Integrity and 120 minutes Insulation. The perimeter track detail was required to be the same as that in BWA 2257600 or FR 3569. The fixing details of the Speedpanel 90° angle junction is detailed in BRANZ assessment report FAR 3454.

3.12 Exova Warringtonfire Assessment Report 22551-01

In Exova Warringtonfire assessment report 22551-01 a loaded 3,000 mm high x 2,790 mm wall which was loaded to simulate a 6,000 mm high Speedpanel wall was assessed as capable of achieving a fire resistance level to be at least 120 minutes Integrity and 120 minutes Insulation. The perimeter track detail is as highlighted in Figure 1 of BRANZ assessment report FAR 3525.

3.13 BRANZ Structural Fire Analysis FAR 3639

In BRANZ structural fire analysis FAR 3639 the overall out-of-plane deflection comprising two components, the sectional thermal gradient and the component due to P-Δ effect were assessed for the vertical and horizontal orientated Speedpanel panels. The assessment report FAR 3639 is valid for panels with a maximum span up to 4,500 mm (aligned horizontally) and panels with a maximum height of 6,000 mm high (aligned vertically). The assessment report also considered the inclusion of an internal panel wall (horizontally aligned) in the Z direction (see Figure 2) and concluded that the internal wall promoted stiffening within the opposing wall and reduced thermal distortion effects.

The assessment concluded that the proposed Speedpanel configuration(s) as highlighted in Figure 1 and Figure 2, when subject to the design constraints discussed in this report, will maintain the required fire resistance rating of 120 minutes integrity and insulation in accordance with AS 1530.4-2005 and AS 1530.4-1997.

4. DISCUSSION

4.1 Test Standard

The fire resistance tests described in section 3.1 and 3.2 were undertaken in accordance with test standard AS 1530.4-2005. The fire resistance tests described in section 3.3, 3.4 and 3.5 were undertaken in accordance with AS 1530.4-1997. The only significant difference between the two versions of the standard with respect to walls is that the 2005 version includes the cotton pad test for determining integrity failure at gaps which develop in the tested specimen.

In test FR 3569 a gap through the specimen was reported after 105 minutes and hot gases could be seen passing out of the joint which was deemed to be an integrity failure. It is therefore considered that if a cotton pad test was applied at this location the specimen would also achieve the same test result if tested in accordance with AS 1530.4-2005.

In test FR 3754 no gaps through the specimen were reported for the 245 minute duration of the test and hence a cotton pad test was not required. It is therefore considered that the specimen would also achieve the same test result if tested in accordance with AS 1530.4-2005.

4.2 Speedpanel Wall Panels

4.2.1 Insulation

It is considered that the relationship between the thickness of the galvanised steel panel sheath, the location of screw fixings and the curvature of the wall greatly influence the walls performance in terms of integrity. This is also true for the effect on insulation of a wall system.

The supporting test evidence reports highlight that the specimens were tested with the minimum number of screw fixings and where the integrity failures occurred in these specimens it mainly occurred due to the panel join opening up which in turn effected the insulation performance of the test specimen.

In the horizontally aligned panel wall tested in fire resistance test BWA 2257600, the thickness of the galvanised steel sheathing of the panels was measured to be 0.22 mm

and only every second panel was screw fixed to the vertical track (500 mm centres). No screws were inserted in the "Interlocking" join of the panels except the bottom two panels with screw centres every 250 mm and 500 mm in the first and second panel, respectively.

The wall panel in fire resistance test BWA 2257600 failed the maximum insulation criteria of 180 K rise at a given point located on the second panel down from the head centrally within 15 mm near a panel join after 117 minutes. The panel join above this began to open after 119 minutes.

It is considered that inserting screw fixings as highlighted in Table 1a at each panel join would maintain the insulation of the horizontally aligned wall panels for at least 120 minutes and by preventing the joints opening up between panels and reducing heat transfer through the join.

Table 1. a - Horizontally Aligned Speedpanel Panels

	Up to 3,000 mm wide	**Above 3,000 mm and up to 4,500 mm wide**
Maximum Wall Width Between Perimeter Walls and Shaft – **X direction**	4,500 mm	4,500 mm
Maximum Wall Height between floor levels NOTE 1 – **Y Direction**	6,000 mm	6,000 mm
Minimum Panel Galv. Steel Sheath Thickness	0.44 mm	0.44 mm
Maximum Fixing Centres at the Panel Interlock Join NOTE 2	1,500 mm	1,500 mm
Vertical Fixing Distance to the Side Track (centre to centre)	500 mm (every second panel)	250 mm (every panel)

NOTE 1 Subject to similar design of Figure 1 where the horizontal panels are interfaced with vertical panels of the same construction. See also Figure 2 for the location of the X and Y components

NOTE 2 Located at each interlocking panel junction.

Table 1.a also includes the maximum fixing centres at the panel interlock join which is based on section 4.2.2

See Table 2.a in section 4.3 for the summary of the minimum perimeter channel/track design criteria to provide 120 minutes Insulation.

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For vertically aligned panels, BRANZ assessment report FAR 3561 is based on the fire resistance tests FR 3754 and FP 3904 for a vertically aligned Speedpanel walls and considers walls up to a height of 4,500 mm and achieving at least 120 minutes Integrity and Insulation fire resistance performance.

BRANZ structural fire analysis FAR 3639 and BRANZ fire resistance assessment report FAR 3525 considers walls above 4,500 mm and up to 6,000 mm high.

BRANZ FAR 3639 considers that the thermal deflection and P-Δ effect will be at it's greatest in the centre of the vertically orientated panel walls. As the panels are orientated vertically the P-Δ effect can be considered negligible, however the thermally induced deflection will cause the panels to bend considerably and this deflection is proportional to the height of the panel.

The structural fire analysis in FAR 3639 considers that the vertical joints between the individual panels can provide enough room for the panels to deflect without prejudicing the integrity or insulation and so the fixing method of the panels to the perimeter track was considered in the Bodycote Warringtonfire fire resistance test of a loaded wall (to simulate a 6,000 mm high wall) and Exova Warrington assessment report EWFA no. 22551-01.

From both of these reports (as well as the previously mentioned reports) the perimeter track detail as highlighted in Table 2.b combined with the screw fixing details highlighted in Table 1.b is considered for walls comprising vertically aligned panels above 4,500 mm high and up to 6,000 mm high.

Table 1. b - Vertically Aligned Speedpanel Panels

	Up to 4,500 mm high	**Above 4,500 mm and up to 6,000 mm high**
Maximum Wall Width Between Perimeter Walls and Shaft – **X direction**	4,500 mm	4,500 mm
Maximum Wall Height between floor levels NOTE 1 – **Y Direction**	4,500 mm	6,000 mm
Minimum Panel Galv. Steel Sheath Thickness	0.44 mm	0.44 mm
Maximum Fixing Centres at the Panel Interlock Join NOTE 2	1,500 mm	750 mm
Horizontal Fixing Distance to the Top and Bottom Track (centre to centre)	See BRANZ Assessment FAR 3561	See BRANZ Assessment FAR 3525

NOTE 1 Subject to similar design of Figure 1 where the horizontal panels are interfaced with vertical panels of the same construction. See also Figure 2 for the location of the X and Y components

NOTE 2 Located at each interlocking panel junction.

Table 1.b also includes the maximum fixing centres at the panel interlock join which is based on section 4.2.2

See Table 2.b in section 4.3 for the summary of the minimum perimeter channel/track design criteria to provide 120 minutes Insulation.

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4.2.2 Integrity

4.2.2.1 Horizontally Aligned Panels

The vertical movement of the panels in fire resistance test BWA 2257600 was limited to approximately 10 mm downwards movement for the 242 minute duration of the test indicating that the panels are largely self supporting and did not experience excessive sagging.

The wall failed Integrity after 128 minutes in this test due to the panel join (which had no screw fixings) located between the top panel and second from the top panel opening up and emitting hot gases. The panel joins of the bottom two panels remained closed for the 242 minute duration of the test due to the screw fixings.

Therefore based on BWA 2257600 with the addition of screw fixings at 1,500 mm centres (as highlighted in Table 1a) and the increased thickness of the galvanised steel sheath, it is considered that the Speedpanel wall up to 4,500 mm wide would achieve at least 120 minutes fire resistance performance in terms of Integrity.

4.2.2.2 Vertically Aligned Panels

BRANZ assessment report FAR 3561 considered that on the basis of the vertical panel joints as tested in FR 3754 could be fixed together at 1,500 mm centres without prejudice to integrity for 4,500 mm high vertical panels for 245 minutes.

Furthermore, the Integrity performance of the vertically aligned panels in fire resistance test BWA 2286900 demonstrated that a 3,000 x 2,790 mm loaded Speedpanel wall (to simulate a 6,000 mm high wall) did not experience any Integrity failure for at least 120 minutes.

The additional supporting structural fire analysis from FAR 3561 considers the negligible P-Δ deflection effect (due to self weight) and the deflection due to thermal effects. It concluded that the space between the panels will enable the vertical panels to deflect and remain intact with the appropriate screw fixings as highlighted in Table 1.b and with the appropriate perimeter track design as highlighted in Table 2.b to maintain a fire resistance period of at least 120 minutes for panels up to 6,000 mm high.

Therefore based on BWA 2286900 and FAR 3561 with the addition of screw fixings as highlighted in Table 1.b it is considered that the non-load bearing Speedpanel wall up to 6,000 mm high would achieve at least 120 minutes fire resistance performance in terms of Integrity.

See Table 2.b in section 4.3 for the summary of the minimum perimeter channel/track design criteria to provide 120 minutes Integrity.

4.2.3 Increase in Speedpanel Panel Height and Width

Based on curvature calculations from the supporting test evidence reports and analysis of FAR 3639, the centre of curvature for a 6,000 mm vertical panel wall is determined to have a deflection approximately twice that of a 4,500 mm high wall.

It is therefore considered that for vertical panels above 4,500 mm and up to 6,000 mm high, halving the distances of the screw fixings centres conservatively to 750 mm vertically at the interlocking joins and using a galvanised steel sheathing thickness of at least 0.44 mm will maintain the Integrity performance of the panels for at least 120 minutes

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For a horizontally orientated panel the deflection will approximately double when increasing the span from 3,000 mm to 4,500 mm wide, however the introduction of screw fixings located at 1,500 mm centres in the wall for horizontally aligned panels will prevent premature separation occurring between the panel interlocking joins. Therefore, increasing the width of the horizontal panels to 4,500 mm with screw fixings at maximum centres 1,500 mm is considered and would not prejudice the Integrity performance of the 0.44 mm thick panel galvanised steel sheathing before at least 120 minutes.

4.3 Perimeter Track Design

The supporting test evidence reports and assessment reports such as FP 3904, FR 3754, FAR 3107 and FAR 3525 or EWFA 22551-01 describe the construction of the different perimeter tracks, configuration, size and fixing details etc. that will provide a minimum integrity and insulation performance of at least 120 minutes.

Therefore, the design criteria of the perimeter track for the Speedpanel walls covered by this assessment will provide a fire resistance performance in terms of Integrity and Insulation for Speedpanel walls of heights up to 6,000 and widths up to 4,500 mm.

Table 2. a - Horizontally Aligned Speedpanel Panels

	Up to 3,000 mm wide	**Above 3,000 mm and up to 4,500 mm wide**
Maximum Wall Width Between Perimeter Walls and Shaft – **X direction**	4,500 mm	4,500 mm
Maximum Wall Height between floor levels [NOTE 1] – **Y Direction**	4,500 mm	6,000 mm
Minimum Panel Galv. Steel Sheath Thickness	0.44 mm	0.44 mm
Assessment Report Containing the Minimum **Perimeter Track Design** Details	FAR 3107, FAR 3561, FP 3904 and FR 3754	FAR 3525 or EWFA 22551-01

[NOTE 1] Subject to similar design of Figure 1 where the horizontal panels are interfaced with vertical panels of the same construction. See also Figure 2 for the location of the X and Y components.

Table 2. b - Vertically Aligned Speedpanel Panels

	Up to 4,500 mm high	**Above 4,500 mm and up to 6,000 mm high**
Maximum Wall Width Between Perimeter Walls and Shaft – **X direction**	4,500 mm	4,500 mm
Maximum Wall Height between floor levels [NOTE 1] – **Y Direction**	4,500 mm	6,000 mm
Minimum Panel Galv. Steel Sheath Thickness	0.44 mm	0.44 mm
Assessment Report Containing the Minimum **Perimeter Track Design** Details	FAR 3107, FAR 3561, FP 3904 and FR 3754	FAR 3525 or EWFA 22551-01

[NOTE 1] Subject to similar design of Figure 1 where the horizontal panels are interfaced with vertical panels of the same construction. See also Figure 2 for the location of the X and Y components.

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4.4 Panel Junction Detail

Figure 1 highlights the two types of Speedpanel Interface details. The minimum design criteria as described in BRANZ assessment reports FAR 3454, FAR 3502 and FAR 3525 shall be incorporated into the interface design. This assessment only covers where the wall is exposed to fire conditions from one side only.

Table 3. a - Horizontally Aligned Speedpanel Panels

	Up to 3,000 mm wide	**Above 3,000 mm and up to 4,500 mm wide**
Maximum Wall Width Between Perimeter Walls and Shaft – **X direction**	4,500 mm	4,500 mm
Maximum Wall Height between floor levels NOTE 1 – **Y Direction**	4,500 mm	6,000 mm
Minimum Panel Galv. Steel Sheath Thickness	0.44 mm	0.44 mm
Assessment Report Containing the Minimum **Panel Junction Design** Details	FAR 3454 and FAR 3502	FAR 3525 or EWFA 22551-01

NOTE 1 Subject to similar design of Figure 1 where the horizontal panels are interfaced with vertical panels of the same construction. See also Figure 2 for the location of the X and Y components.

Table 3. b - Vertically Aligned Speedpanel Panels

	Up to 4,500 mm high	**Above 4,500 mm and up to 6,000 mm high**
Maximum Wall Width Between Perimeter Walls and Shaft – **X direction**	4,500 mm	4,500 mm
Maximum Wall Height between floor levels NOTE 1 – **Y Direction**	4,500 mm	6,000 mm
Minimum Panel Galv. Steel Sheath Thickness	0.44 mm	0.44 mm
Assessment Report Containing the Minimum **Panel Junction Design** Details	FAR 3454 and FAR 3502	FAR 3525 or EWFA 22551-01

NOTE 1 Subject to similar design of Figure 1 where the horizontal panels are interfaced with vertical panels of the same construction. See also Figure 2 for the location of the X and Y components.

5. CONCLUSION

It is considered that the Speedpanel non-load bearing, pre-cast, concrete vertical and horizontal panel wall system as highlighted in Figure 1 would achieve a fire resistance, in accordance with AS 1530.4-1997 and AS 1530.4-2005, of at least 120 minutes Integrity and 120 minutes Insulation with the minimum design criteria contained in section 4 and summarised in Table 4 (see page 16)

6. LIMITATIONS

This assessment report is subject to the accuracy and completeness of the information supplied.

BRANZ reserves the right to amend or withdraw this report should additional information become available regarding the fire performance of the product assessed herein.

This assessment considers:

1. The wall and/or shaft Speedpanel systems discussed within the report are exposed to fire conditions from one face only.
2. All walls in the systems are non-load bearing.
3. The combined load of the “X” and “Z” walls onto the “Y” vertical wall (as highlighted in Figure 2) should not exceed 180 kg per linear meter. Variations to this limitation will require structural analysis on a project specific basis.
4. Where the perimeter tracks pass through a floor slab, they should be overlapped by at least 350 mm and in all cases should additionally be fixed using a minimum size M8 steel bolt penetrating the floor slab edge, centrally, by at least 50 mm.

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Table 4 –Summary Installation Guide

	Up to 4,500 mm high perimeter walls between floor slabs (Y-Direction)	Minimum angle thickness and size for vertical panel orientation (Figure 1 page 17)	Minimum C-track thickness and size for vertical panel orientation (Figure 1 page 17)	Minimum C-track thickness and size for horizontal panel orientation	Above 4,500 mm up to 6,000mm high perimeter walls between floor slabs (Y-Direction)	Minimum angle thickness and size for vertical panel orientation (Figure 1 page 17)	Minimum bottom C-track thickness and size for vertical panel orientation (Figure 1 page 17)	Minimum C-track thickness and size for horizontal and head track application for walls in the Y-Direction (Figure 2 page 18)
Maximum width X direction	4,500 mm	50x50mm Bmt 1.2mm 250 Mpa *	55x80 mm internal Clearance Bmt 1.2mm 250 Mpa *	50x50mm Bmt 1.2mm 250 Mpa *	4,500 mm	50x50mm Bmt 1.2mm 250 Mpa *	50 X 80mm internal Clearance Bmt 1.2mm 250 Mpa *	90 X 80mm internal Clearance Bmt 1.2mm 250 Mpa * Shielded Ctrack
Maximum width z section between x directional cross walls	4,500 mm	50x50mm Bmt 1.2mm 250 Mpa *	55x80 mm internal Clearance Bmt 1.2mm 250 Mpa *	50x50mm Bmt 1.2mm 250 Mpa *	4,500 mm	50x50mm Bmt 1.2mm 250 Mpa *	50 X 80mm internal Clearance Bmt 1.2mm 250 Mpa *	90 X 80mm internal Clearance Bmt 1.2mm 250 Mpa * Shielded Ctrack 150mm Bmt 1.2mm 250 Mpa *
Screw fixing distance	1,500 mm				750 mm			
Minimum panel galv. Steel sheath thickness	0.44 mm				0.44 mm			
Vertical fixing distance side track	500 mm				250 mm			
Assessment report containing the minimum perimeter track design	FAR 3107, FAR 3561, FP 3904 and FR 3754				FAR 3525 and EWFA 22551-01			
Assessment report containing the minimum panel junction design details	FAR 3454 and FAR 3502				FAR 3454 and FAR 3502			

* 250 Mpa indicates that the Angle /C-Track is "Grade-250" mild steel

Figure 1 – Horizontal and Vertical Speedpanel Configuration

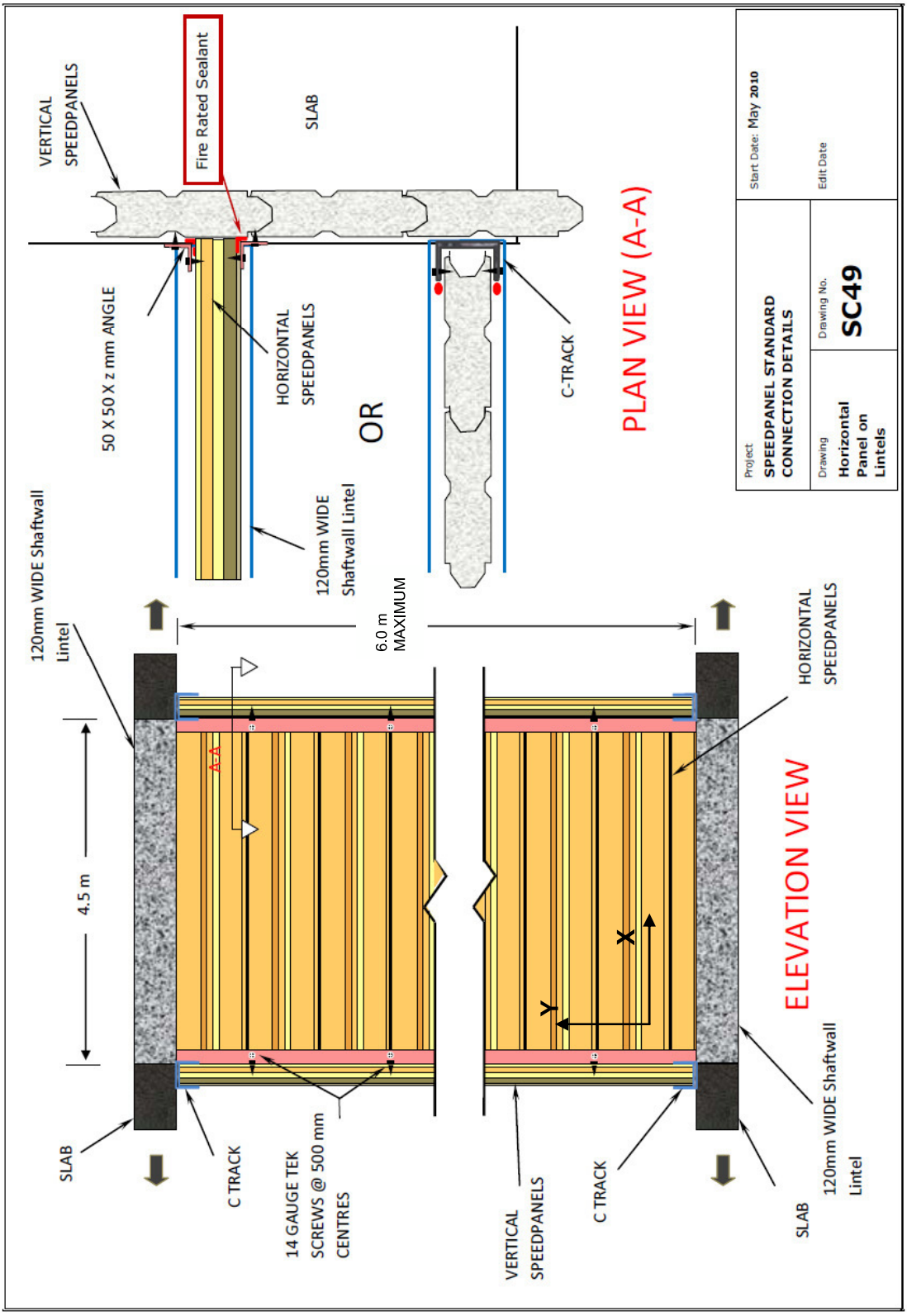

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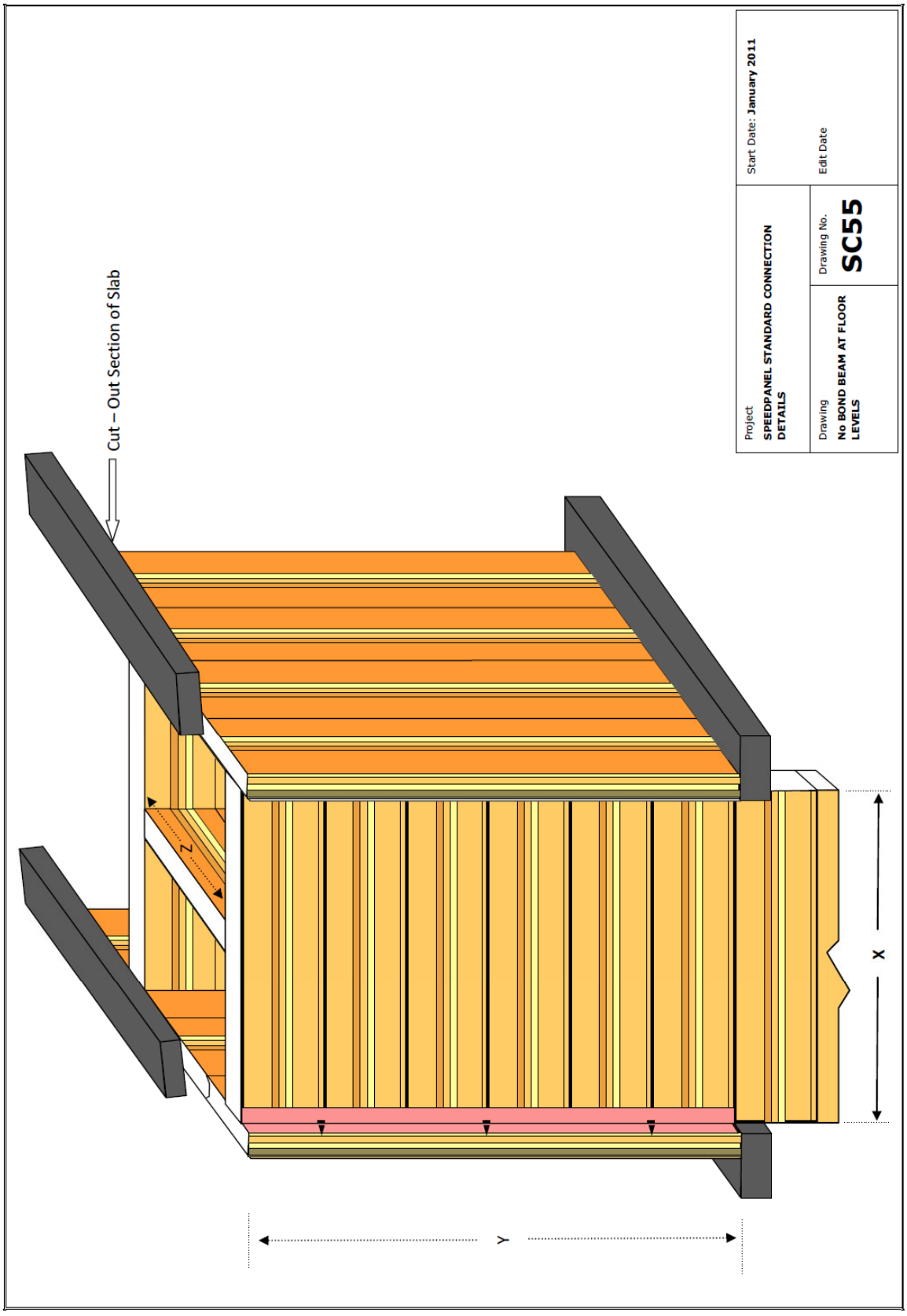
Figure 2 – X, Y and Z Components



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