3 April 2024

Outdoor Blinds and Awnings
17 Henderson St
Turrella NSW 2205

DESIGN CERTIFICATION

Re: Design of down pipe, gutter and wind loading for twist opening roof to be used within wind regions A, B and C.

This is to certify that I have carried out design checks including the down pipe, gutter and wind loading for the proposed twist opening roof to be used within wind regions A, B and C. The plans were provided by the client and are attached to this document. The design was carried out in accordance with NCC Building Code of Australia 2022 Volume 1 and in accordance with AS/NZS 3500.3:2018 and AS/NZS AS1170.2-2021.

The twist opening roof system enables the roof to be opened or closed and incorporates its own gutter system for storm water collection. A catchment area up to 4.7 m x 7000 m was assessed to determine how many and what size of downpipes are required. The blade section was analysed in strand7 software and they were checked for deflection and ultimate stress capability.

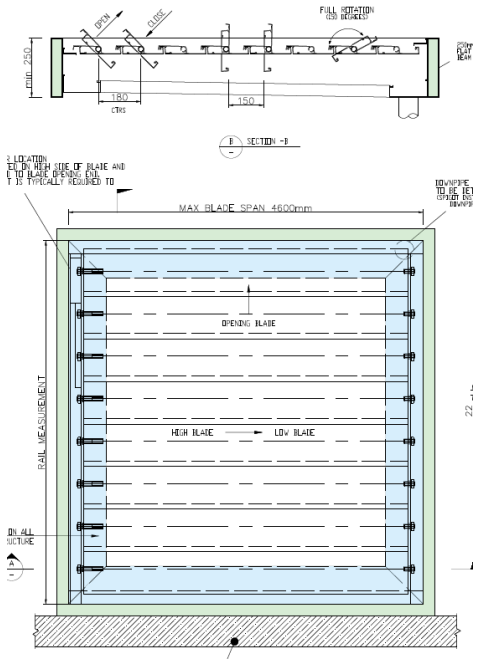


Figure 1 Basic Layout of Twist Roof

A rain intensity of 250 mm/hr was used this is suitable for the majority of regions on the east coast up to Mackay QLD.
Wind Regions and speeds

- Region A – 41m/s - 1.01 kPa
- Region B – 51.9 m/s - 1.62 kPa
- Region C – 64.5 m/s - 2.5 kPa

In summary the catchment area for up to 250mm / hr requires a 90mm downpipe installed for a minimum area of 26 m². Thus at 4700 mm wide a downpipe is required approximately every 5000mm length of twist roof for the gutter installed. The blades are suitable for use in areas up to wind region C however in these regions they might exhibit slightly more deflection than normal with 20.3mm with 14.6 being the industry standard.

This certificate shall not be construed as relieving any other party of their responsibilities, liabilities or contractual obligations and does not certify the installation of the twist roof where installed. It is recommended that upon installation a chartered preffesional engineer certify the installation at each side where required.

Yours faithfully,

Ryan Chalmers

Ryan Chalmers
CPEng, NER, 3826369
NSW & TAS BDC3431
VIC PE0000408
QLD RPEQ 21681

Design Checks

For Outdoor Blinds and Awnings
EAVES GUTTER AND DOWN PIPE DESIGN TO AS/NZS 3500.3: 2018
Twist Opening Roof System

Design Check Results

This catchment requires: min number of Downpipes = 1
Downpipe size = 90 mm min
Eaves gutter cross sectional Area = 8000 sq.mm.
Max catchment Area per downpipe for this combination = 26.38 m²

For the installation of Twist Opening Roof System that exceeds 26.5 m² it is recommended to use minimum 1 downpipe every 4.5m long to 4.7m wide. Downpipe size 90mm and min. gutter cross sectional Area = 7892 sq.mm. (Twist roof 8000)

Horizontal catchment area Ah = 26 sq.m
Roof Average slope S = 2 degrees
Intensity I = 250 mm/hr
From AS3500 Table 3.4.5.2, C'ment Area Multiplier f = 1.017
Roof Area allowing for slope Ac = Ah*f = 26.5 sq.m
Total runoff from roof q = I*A/3600 litres/sec = 1.84 litres/sec
Down pipe size selected Dia. = 90 mm

Possible Downpipe combinations and gutter sizes.

POSSIBLE OPTIONS

	Number Req'd	Number Used	Gutter Area	Gutter Width	Gutter Depth
90 Dia:	0.89	1	7892	125	65
100 Dia:	0.7	1	7892	125	65
150 Dia:	0.28	1	7892	175	56
225 Dia:	0.11	1	7892	250	42
300 Dia:	0.06	1	7892	325	35

DOWNPIPE CAPACITY In terms of Plan area of roof.

	90 Dia	100 Dia	150 Dia	225 Dia	300 Dia
Max Catchment Area (sq.m)	29	37	93	238	456
Gutter Area (sq.mm)	8900	11000	24700	54762	97237

Wind Checks

Blade Material 6061 T6 – Fy – 276 mPa
Design Yield stress – 0.95*276 = 262 mPa

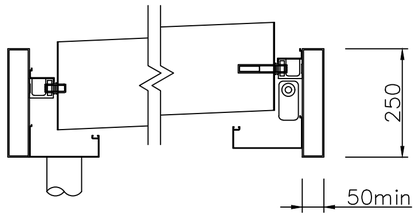
WIND REGION A = Design Wind speed of 41m/s or 147.6km/h - 1.01kPA
Loading to Roof / blade = 0.41 SVC / 0.82 Ult (kPa)
Deflection – 9.6 mm < 4400/300 = 14.7
Stress – 41.4 MPA < 260 MPA

WIND REGION B = Design Wind speed of 51.9m/s or 186.84km/h – 1.62kPA
Loading to Roof / blade = 0.67 SVC / 1.3 Ult (kPa)
Deflection – 14.5 mm < 4400/300 = 14.7
Stress – 65.8 MPA < 260 MPA

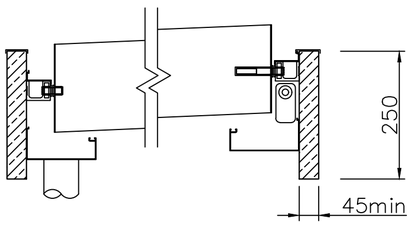
WIND REGION C = Design Wind Speed of 64.5m/s or 232.2km/h – 2.5kPA
Loading to Roof / blade = 1.01 SVC / 2.02 Ult (kPa)
Deflection – 20.3 mm > 4400/300 = 14.7
Stress – 95.3 MPA < 260 MPA

ABBOT DESIGN
PO Box 252
Cooranbong NSW 2265
1800 027 882
admin@abbotdesign.com.au

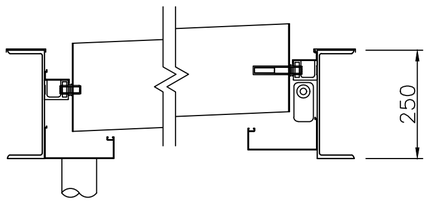
TYPE 1
ALUMINIUM FRAME



TYPE 2
TIMBER FRAME

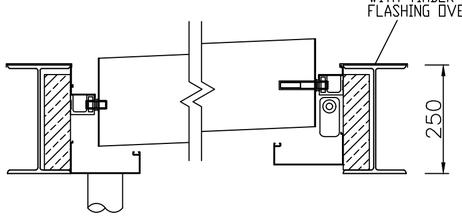


TYPE 3
REVERSE STEEL PFC

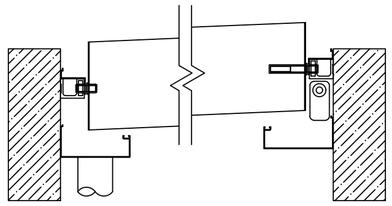


TYPE 4
CLADDED UNIVERSAL BEAM

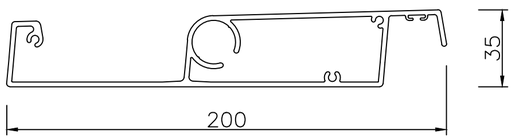
250mm EYE/UNIVERSAL BEAM
WITH TIMBER PACKING AND
FLASHING OVER INSIDE

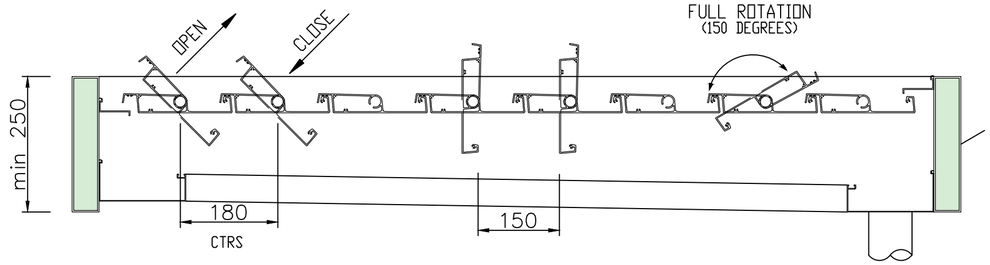


TYPE 5
MASONRY REVEAL/FRAME



LR200 LOUVRE BLADE DETAIL

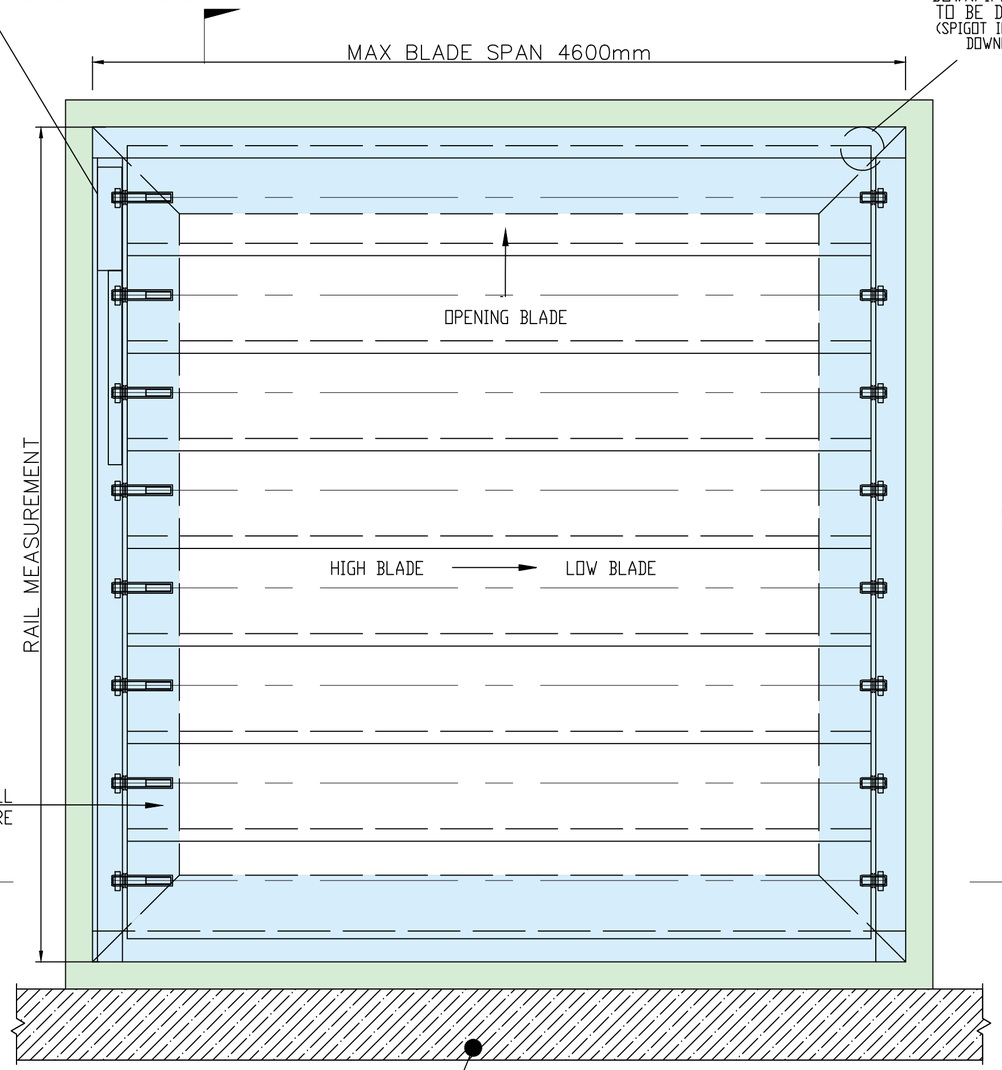




B
-
SECTION -B

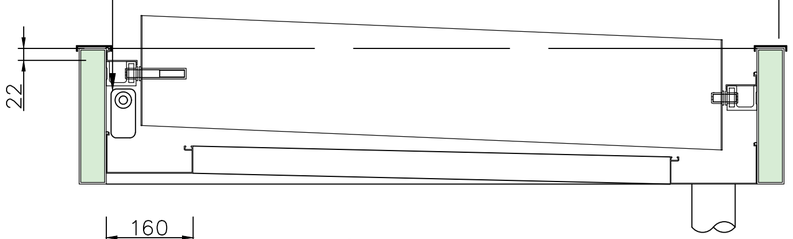
LINEAR MOTOR LOCATION
POWER LOCATED ON HIGH SIDE OF BLADE AND
OPPOSITE END TO BLADE OPENING END.
(A SITE VISIT IS TYPICALLY REQUIRED TO
MARK POWER)

DOWNPIPE SPIGOT LOCATION
TO BE DETERMINED ONSITE.
(SPIGOT INSTALLED BY OBA AND
DOWNPIPES BY OTHERS)



240V ACTUATOR
(LOCATED AT LOW SIDE OF
LOUVRE BLADE)

OPTIONAL OVER FLASHING
PROFILE ON OBA STRUCTURES



A
-
VIEW - A

DOWNPIPE SPIGOT IS INSTALLED BY OBA
LOW SIDE OF BLADE IS RECOMMENDED.
(DOWNPIPE IS BY OTHERS)
OBA WILL NOT RECOMMEND HORIZONTAL
SPIGOT DESIGN AND ONLY
VERTICAL DOWNPIPE SPIGOTS.

LEGEND:

THIS INDICATES SUPPORT FRAME BY CLIENT
OR BY OBA.
(OBA FRAME IS OPTIONAL)

THIS INDICATES GUTTER

MED TWIST LR200 MODEL	
BLADE SPECIFICATIONS	
BLADE DESIGN	LINEAR
BLADE DIMENSIONS	200mm x 35mm x 2.1mm
BLADE MATERIAL	EXTRUDED ALUMINIUM 6061-T6
BLADE FINISH	POWDER COATED
BLADE CENTERS	180mm
BLADE OPENING	150mm
GUTTER SPECIFICATIONS	
GUTTER DESIGN	SQUARE EDGE
GUTTER DIMENSHIONS	160mm x 50mm
GUTTER MATERIAL	EXTRUDED ALUMINIUM 6061-T6
GUTTER FINISH	POWDER COATED
RAIL SPECIFICATIONS	
RAIL TRACK	55mm x 45mm x 6mm
RAIL TRACK MATERIAL	EXTRUDED ALUMINIUM 6063-T5
RAIL TRACK FINISH	POWDER COATED
CONTROL BAR SPECIFICATIONS	
CONTROL BAR	50mm x 10mm x 3mm
CONTROL BAR MATERIAL	EXTRUDED ALUMINIUM 6063-T5
CONTROL BAR FINISH	POWDER COATED
PARTS AND CONNECTOR SPECIFICATIONS	
PIN SET	14.3mm DIA 316 MARINE GRADE STAINLESS STEEL
SPRING SET	316 MARINE GRADE STAINLESS STEEL
CONNECTOR HOUSING	100% UV STABLE POM-H
WEATHER STRIP	PVC STORM INSERTION STRIP
MOTOR & CONTROL SPECIFICATIONS	
MOTOR TYPE	240V ACTUATOR
CONTROLS	HARD WIRED OR REMOTE OPERATION
SENSORS	RAIN, WIND & SUN SENSORS

PROFESSIONAL ENGINEER
Mr Ryan Chalmers
MIEAusT CPEng NER
NSW/TAS BDC3431
VIC PE0000408
QLD RPEQ21681
Signature
Date 3.04.24.
REGISTERED CHARTERED NER 3826369
AREA of PRACTICE - CIVIL / STRUCTURAL
ABBOT DESIGN admin@abbotdesign.com.au 1800 027 882

SUITABLE FOR INSTALLATION IN REGIONS A/B/C.
MAXIMUM RAIN INTESITY 250 MM /HR (MACKAY)
MIN 1 X 90MM DOWNPIPE FOR EVERY 26M2

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBURR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING | REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL:

WEIGHT:

TITLE:
OBA AUSTRALIA
SALES@OBAAU.COM.AU
WWW.OBAAU.COM.AU

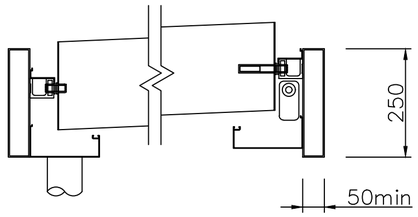
DWG NO.
MED TWIST LR200 SYSTEM
BLADES PARALLEL TO BUILDING

A2

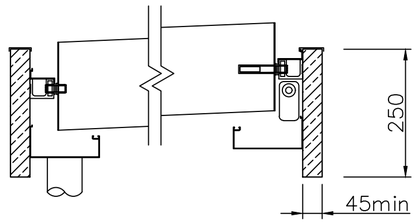
SCALE:1:2

SHEET 1 OF 1

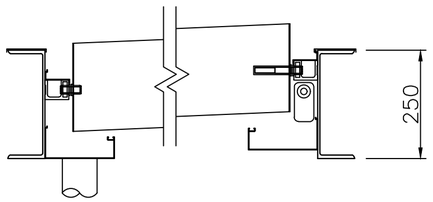
TYPE 1
ALUMINIUM FRAME



TYPE 2
TIMBER FRAME

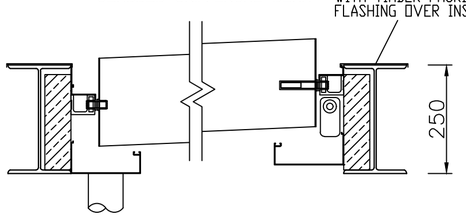


TYPE 3
REVERSE STEEL PFC

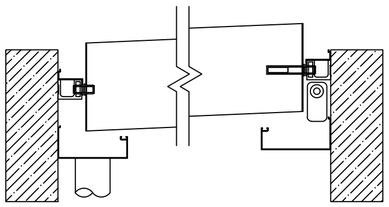


TYPE 4
CLADDED UNIVERSAL BEAM

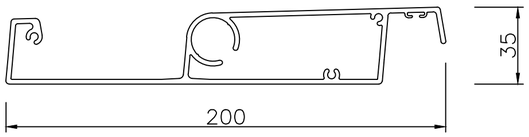
250mm EYE/UNIVERSAL BEAM WITH TIMBER PACKING AND FLASHING OVER INSIDE

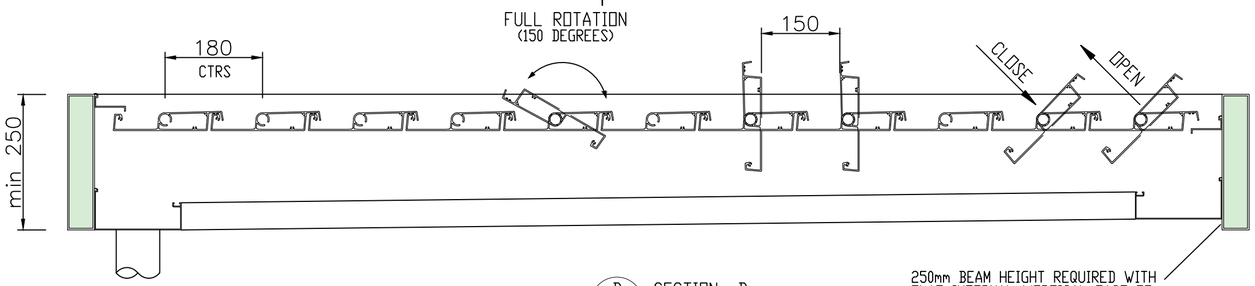


TYPE 5
MASONRY REVEAL/FRAME



LR200 LOUVRE BLADE DETAIL



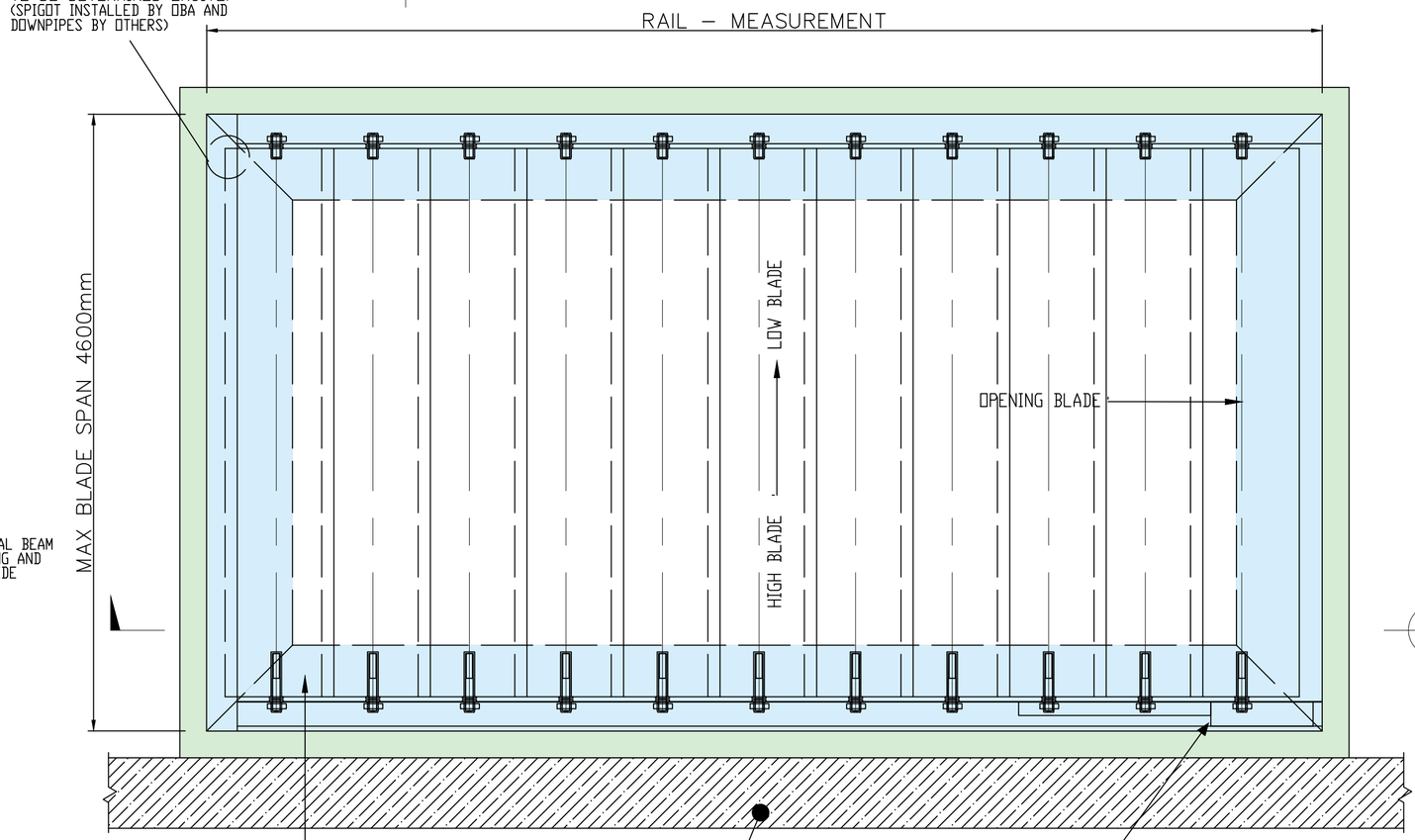


B – SECTION -B

250mm BEAM HEIGHT REQUIRED WITH FLAT INTERNAL VERTICAL FACE OF BEAM WITHIN +-5MM TOLERANCE

A

DOWNPIPE SPIGOT LOCATION TO BE DETERMINED ONSITE. (SPIGOT INSTALLED BY OBA AND DOWNPIPES BY OTHERS)



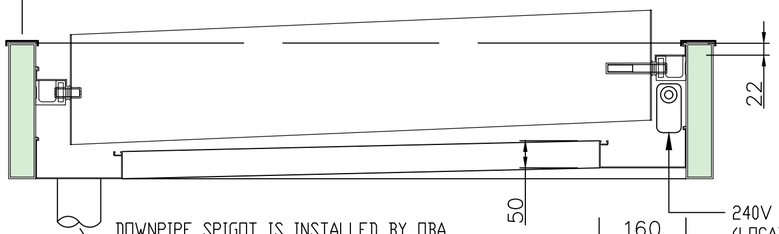
GUTTER LOCATED ON ALL 4 SIDES OF STRUCTURE

EXISTING WALL

LINEAR MOTOR LOCATION
POWER LOCATED ON HIGH SIDE OF BLADE AND OPPOSITE END TO BLADE OPENING END.
(A SITE VISIT IS TYPICALLY REQUIRED TO MARK POWER)

B –

OPTIONAL OVER FLASHING PROFILE ON OBA STRUCTURES



240V ACTUATOR
(LOCATED AT LOW SIDE OF LOUVRE BLADE)

DOWNPIPE SPIGOT IS INSTALLED BY OBA
LOW SIDE OF BLADE IS RECOMMENDED.
(DOWNPIPE IS BY OTHERS)
OBA WILL NOT RECOMMEND HORIZONTAL SPIGOT DESIGN AND ONLY VERTICAL DOWNPIPE SPIGOTS.

A – VIEW - A

MED TWIST LR200 MODEL	
BLADE SPECIFICATIONS	
BLADE DESIGN	LINEAR
BLADE DIMENSIONS	200mm x 35mm x 2.1mm
BLADE MATERIAL	EXTRUDED ALUMINIUM 6061–T6
BLADE FINISH	POWDER COATED
BLADE CENTERS	180mm
BLADE OPENING	150mm
GUTTER SPECIFICATIONS	
GUTTER DESIGN	SQUARE EDGE
GUTTER DIMENSHIONS	160mm x 50mm
GUTTER MATERIAL	EXTRUDED ALUMINIUM 6061–T6
GUTTER FINISH	POWDER COATED
RAIL SPECIFICATIONS	
RAIL TRACK	55mm x 45mm x 6mm
RAIL TRACK MATERIAL	EXTRUDED ALUMINIUM 6063–T5
RAIL TRACK FINISH	POWDER COATED
CONTROL BAR SPECIFICATIONS	
CONTROL BAR	50mm x 10mm x 3mm
CONTROL BAR MATERIAL	EXTRUDED ALUMINIUM 6063–T5
CONTROL BAR FINISH	POWDER COATED
PARTS AND CONNECTOR SPECIFICATIONS	
PIN SET	14.3mm DIA 316 MARINE GRADE STAINLESS STEEL
SPRING SET	316 MARINE GRADE STAINLESS STEEL
CONNECTOR HOUSING	100% UV STABLE POM–H
WEATHER STRIP	PVC STORM INSERTION STRIP
MOTOR & CONTROL SPECIFICATIONS	
MOTOR TYPE	240V ACTUATOR
CONTROLS	HARD WIRED OR REMOTE OPERATION
SENSORS	RAIN, WIND & SUN SENSORS

PROFESSIONAL ENGINEER
Mr Ryan Chalmers
MIEAust CPEng NER
NSW/TAS BDC3431
VIC PE0000408
QLD RPEQ21681
Signature
Date 3.04.24.
REGISTERED CHARTERED NER 3826369
AREA of PRACTICE - CIVIL / STRUCTURAL
ABBOT DESIGN admin@abbotdesign.com.au 1800 027 882

LEGEND:

THIS INDICATES SUPPORT FRAME BY CLIENT OR BY OBA.
(OBA FRAME IS OPTIONAL)

THIS INDICATES GUTTER

SUITABLE FOR INSTALLATION IN REGIONS A/B/C.
MAXIMUM RAIN INTESITY 250 MM /HR (MACKAY)
MIN 1 X 90MM DOWNPIPE FOR EVERY 26M2

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:	DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL:
WEIGHT:

TITLE:
OBA AUSTRALIA
SALES@OBAAU.COM.AU
WWW.OBAAU.COM.AU

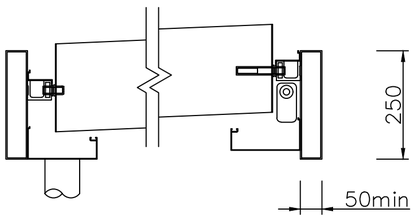
DWG NO. MED TWIST LR200 SYSTEM
BLADES PERPENDICULAR WITH BUILDING
A2

SCALE:1:2
SHEET 1 OF 1

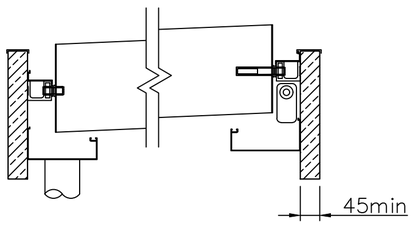
MED TWIST - LR200 MODEL

OPENING LOUVRED ROOF SYSTEM
PIVOT TRACK DETAIL
MOTOR, DRIVE AND HIGH-SIDE

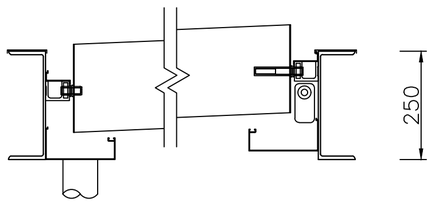
TYPE 1
ALUMINIUM FRAME



TYPE 2
TIMBER FRAME

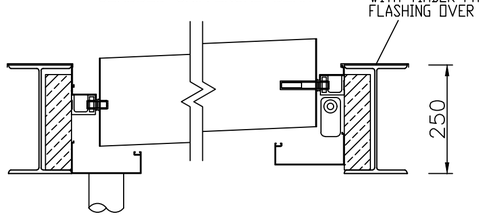


TYPE 3
REVERSE STEEL PFC

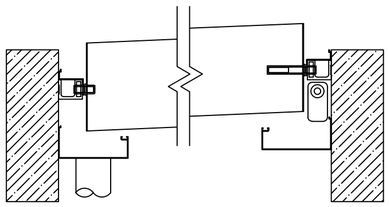


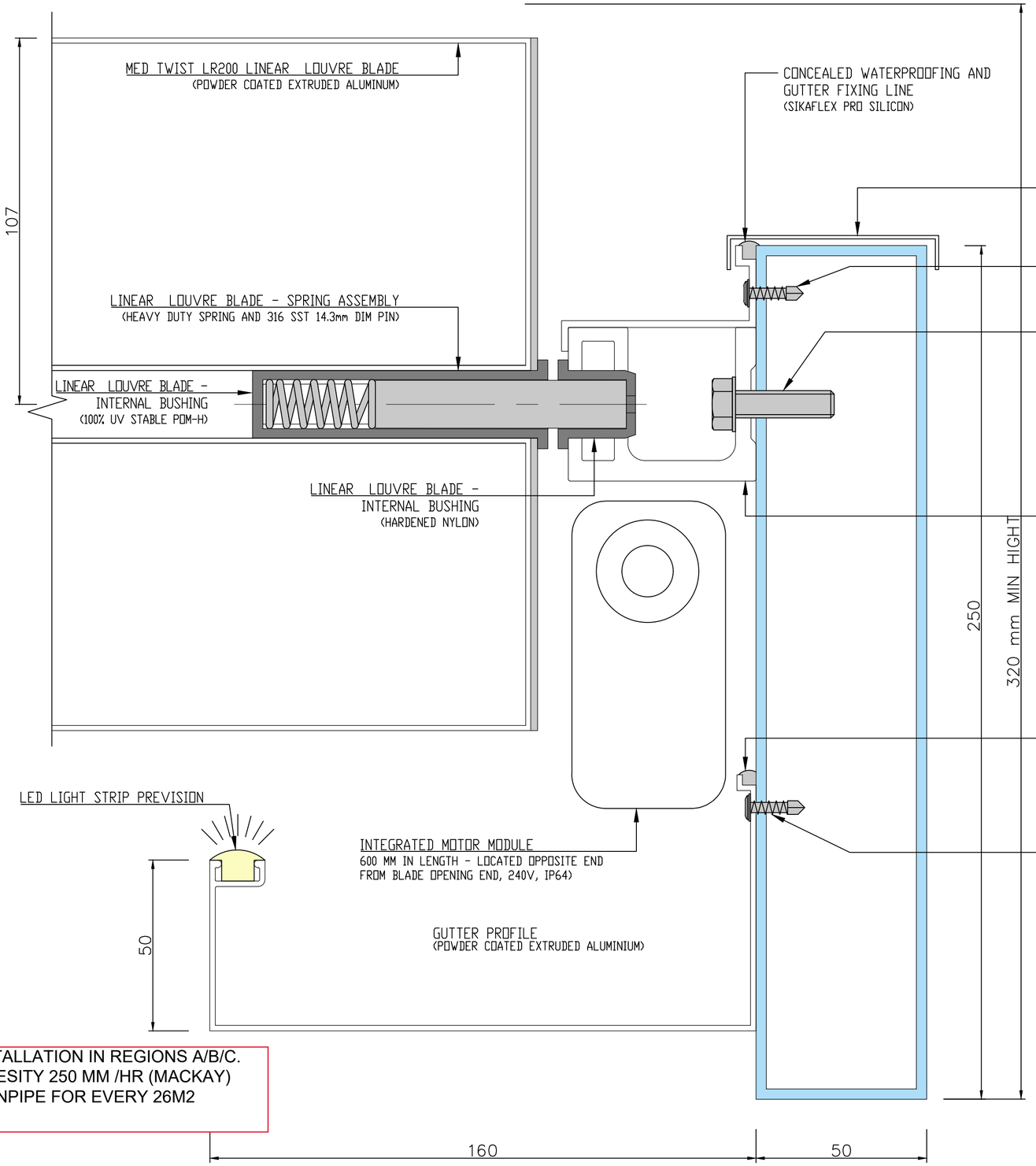
TYPE 4
CLADDED UNIVERSAL BEAM

250mm EYE/UNIVERSAL BEAM WITH TIMBER PACKING AND FLASHING OVER INSIDE



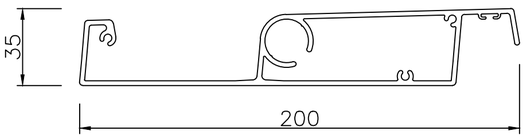
TYPE 5
MASONRY REVEAL/FRAME





SUITABLE FOR INSTALLATION IN REGIONS A/B/C.
MAXIMUM RAIN INTESITY 250 MM /HR (MACKAY)
MIN 1 X 90MM DOWNPIPE FOR EVERY 26M2

LR200 LOUVRE BLADE DETAIL



Please Note: If a bay includes more than 32 louvre blades and or if the louvre blade and gutter is configured with apposing falls it may not be achievable to use a 250 mm beam depth and the beam depth may need to be increased.

BLUE LINE INDICATES MED TWIST SERIES - SUPPORT FRAME AS OPTIONAL (POWDER COATED ALUMINIUM, STEEL OR TIMBER)
OR
SUPPORT FRAME CONSTRUCTED BY CLIENT
(TIMBER, STEEL, CONCRETE, CLADDED OR ALUMINIUM)

PROFESSIONAL ENGINEER NSW/TAS BDC3431
Mr Ryan Chalmers VIC PE0000408
MIEAusT CPEng NER QLD RPEQ21681
Signature Date 3.04.24.
REGISTERED CHARTERED NER 3826369
AREA of PRACTICE - CIVIL / STRUCTURAL
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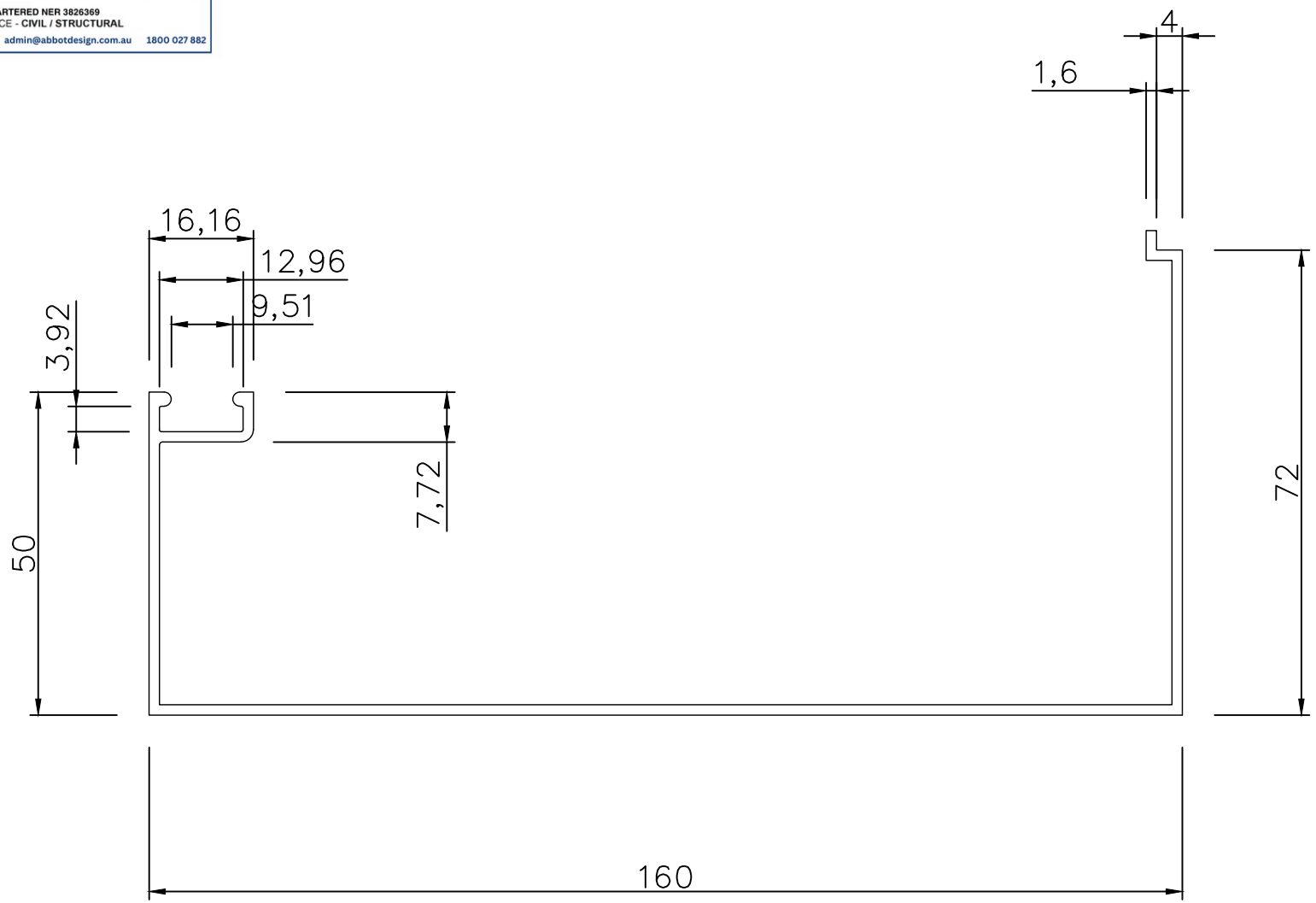
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:			DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING / REVISION
	NAME	SIGNATURE	DATE		TITLE: OBA AUSTRALIA SALES@OBAAU.COM.AU WWW.OBAAU.COM.AU
DRAWN					
CHK'D					
APPV'D					
MFG					
Q.A				MATERIAL:	DWG NO. MED TWIST LR200 SYSTEM DETAILS / A2
WEIGHT:					SCALE:1:2 / SHEET 1 OF 1

PROFESSIONAL ENGINEER
Mr Ryan Chalmers
MIEAusT CPEng NER
NSW/TAS BDC3431
VIC PE0000408
QLD RPEQ21681
Signature
03.04.24.
Date
REGISTERED CHARTERED NER 3826369
AREA of PRACTICE - CIVIL / STRUCTURAL
ABBOT DESIGN admin@abbotdesign.com.au 1800 027 882



SUITABLE FOR INSTALLATION IN REGIONS A/B/C.
MAXIMUM RAIN INTESITY 250 MM /HR (MACKAY)
MIN 1 X 90MM DOWNPIPE FOR EVERY 26M2

General Notes

No.	Revision/Issue	Date

Firm Name and Address

Project Name and Address

Project

Sheet
1

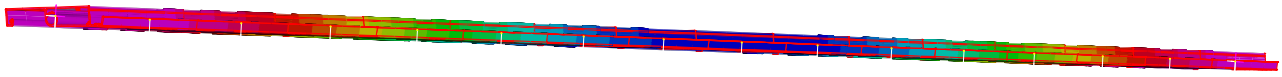
Date
6.12.23

Scale
1:1

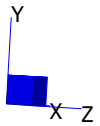
Title:	
TWIST ROOF CHECKS	
Project:	
TWIST ROOF - OUTDOOR BLINDS AND AWNINGS	
Author: **RC**	Reference:

Beam Disp:DY (mm)

0.000000×10^{0} [Bm:1]
-5.066337×10^{-1}
-1.519901×10^{0}
-2.533168×10^{0}
-3.546436×10^{0}
-4.559703×10^{0}
-5.572970×10^{0}
-6.586237×10^{0}
-7.599505×10^{0}
-8.612772×10^{0}
-9.626039×10^{0} [Bm:8]



PROFESSIONAL ENGINEER
Mr Ryan Chalmers
MIEAust CPEng NER
NSW/TAS BDC3431
VIC PE0000408
QLD RPEQ21681
Signature
Date 03.04.24.
REGISTERED CHARTERED NER 3826369
AREA of PRACTICE - CIVIL / STRUCTURAL
ABBOT DESIGN admin@abbotdesign.com.au 1800 027 882

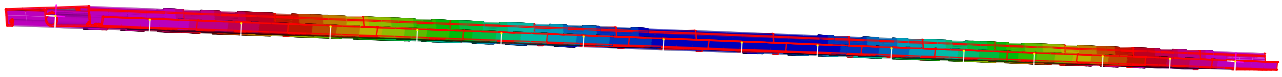


16 Nodes	0 Vertices	View	5: REGION A [Combination 1]
15 Beams	0 Edges	RX: 5.9	1: Freedom Case 1
0 Plates	0 Loops	RY: 59.7	Scale: 0.0 %
0 Bricks	0 Faces	RZ: -6.2	
0 Links	0 Surfaces		
0 Paths			

Title: **TWIST ROOF CHECKS**	
Project: **TWIST ROOF - OUTDOOR BLINDS AND AWNINGS**	
Author: **RC**	Reference:

Beam Disp:DY (mm)

0.000000×10^{0} [Bm:1]
-7.623662×10^{-1}
-2.287099×10^{0}
-3.811831×10^{0}
-5.336564×10^{0}
-6.861296×10^{0}
-8.386029×10^{0}
-9.910761×10^{0}
-1.143549×10^{1}
-1.296023×10^{1}
-1.448496×10^{1} [Bm:8]



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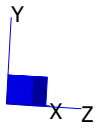
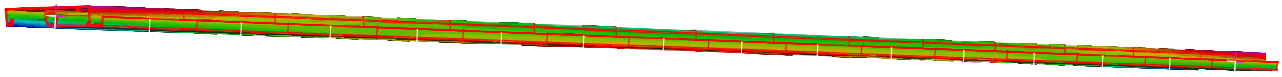


16 Nodes	0 Vertices	View	6: REGION B [Combination 2]
15 Beams	0 Edges	RX: 5.9	1: Freedom Case 1
0 Plates	0 Loops	RY: 59.7	Scale: 0.0 %
0 Bricks	0 Faces	RZ: -6.2	
0 Links	0 Surfaces		
0 Paths			

Title: **TWIST ROOF CHECKS**	
Project: **TWIST ROOF - OUTDOOR BLINDS AND AWNINGS**	
Author: **RC**	Reference:

Beam Bending Stress1 (kPa)

9.025371×10^{4} [Bm:1]
8.048897×10^{4}
6.095950×10^{4}
4.143002×10^{4}
2.190055×10^{4}
2.371075×10^{3}
-1.715840×10^{4}
-3.668787×10^{4}
-5.621735×10^{4}
-7.574682×10^{4}
-9.527629×10^{4} [Bm:1]



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MIEAusT CPEng NER
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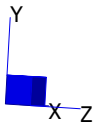
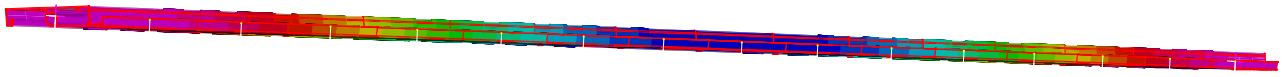


16 Nodes	0 Vertices	View	10: Combination Case [Combination 6]
15 Beams	0 Edges	RX: 5.9	1: Freedom Case 1
0 Plates	0 Loops	RY: 59.7	Scale: 0.0 %
0 Bricks	0 Faces	RZ: -6.2	
0 Links	0 Surfaces		
0 Paths			

Title:	**TWIST ROOF CHECKS**
Project:	**TWIST ROOF - OUTDOOR BLINDS AND AWNINGS**
Author: **RC**	Reference:

Beam Disp:DY (mm)

0.000000×10^{0} [Bm:1]
-1.071009×10^{0}
-3.213027×10^{0}
-5.355045×10^{0}
-7.497063×10^{0}
-9.639081×10^{0}
-1.178110×10^{1}
-1.392312×10^{1}
-1.606514×10^{1}
-1.820715×10^{1}
-2.034917×10^{1} [Bm:8]



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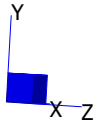
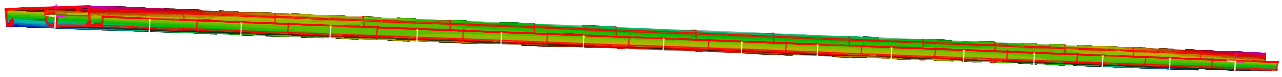


16 Nodes	0 Vertices	View	7: REGION C [Combination 3]
15 Beams	0 Edges	RX: 5.9	1: Freedom Case 1
0 Plates	0 Loops	RY: 59.7	Scale: 0.0 %
0 Bricks	0 Faces	RZ: -6.2	
0 Links	0 Surfaces		
0 Paths			

Title:	
TWIST ROOF CHECKS	
Project:	
TWIST ROOF - OUTDOOR BLINDS AND AWNINGS	
Author: **RC**	Reference:

Beam Bending Stress1 (kPa)

6.235483×10^{4} [Bm:1]
5.560853×10^{4}
4.211593×10^{4}
2.862333×10^{4}
1.513074×10^{4}
1.638137×10^{3}
-1.185446×10^{4}
-2.534706×10^{4}
-3.883966×10^{4}
-5.233226×10^{4}
-6.582485×10^{4} [Bm:1]



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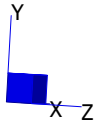

16 Nodes	0 Vertices	View	9: Combination Case [Combination 5]
15 Beams	0 Edges	RX: 5.9	1: Freedom Case 1
0 Plates	0 Loops	RY: 59.7	Scale: 0.0 %
0 Bricks	0 Faces	RZ: -6.2	
0 Links	0 Surfaces		
0 Paths			

Title:	**TWIST ROOF CHECKS**
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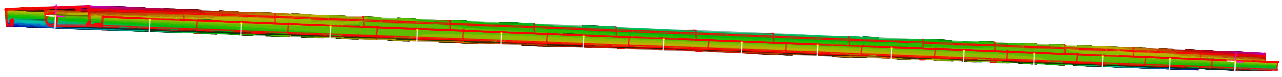
Author: **RC**	Reference:

Beam Bending Stress1 (kPa)

3.923862×10^{4} [Bm:1]
3.499331×10^{4}
2.650269×10^{4}
1.801208×10^{4}
9.521462×10^{3}
1.030846×10^{3}
-7.459770×10^{3}
-1.595039×10^{4}
-2.444100×10^{4}
-3.293162×10^{4}
-4.142223×10^{4} [Bm:1]



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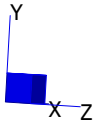

16 Nodes	0 Vertices	View	8: Combination Case [Combination 4]
15 Beams	0 Edges	RX: 5.9	1: Freedom Case 1
0 Plates	0 Loops	RY: 59.7	Scale: 0.0 %
0 Bricks	0 Faces	RZ: -6.2	
0 Links	0 Surfaces		
0 Paths			