Feature PFC Stringer

design elements

P2

arden
ARCHITECTURAL STAIRCASES

design

Structural steel members are surprisingly graceful and have a beauty all of their own. That is, they do if you get the design right, and we believe we have done just that with the P2 Feature PFC design.

In the P1 design, the PFC members get the structural work done 'behind the scenes' and permit a wide variety of cladding methods. In contrast, the P2 represents a very specific design, with interlocking structural steel members being the main structural feature. This brings a source of tension into the design, as the relatively open and sparse profile contrasts with the weight and impact of the structural steel.

If pure heavy metal isn't your style, the P2 can be modified to present a more refined appearance by the installation of timber panels within each member. Figure (5) illustrates that this can accent the natural geometric lines of the staircase with timber grain and shadow line details.

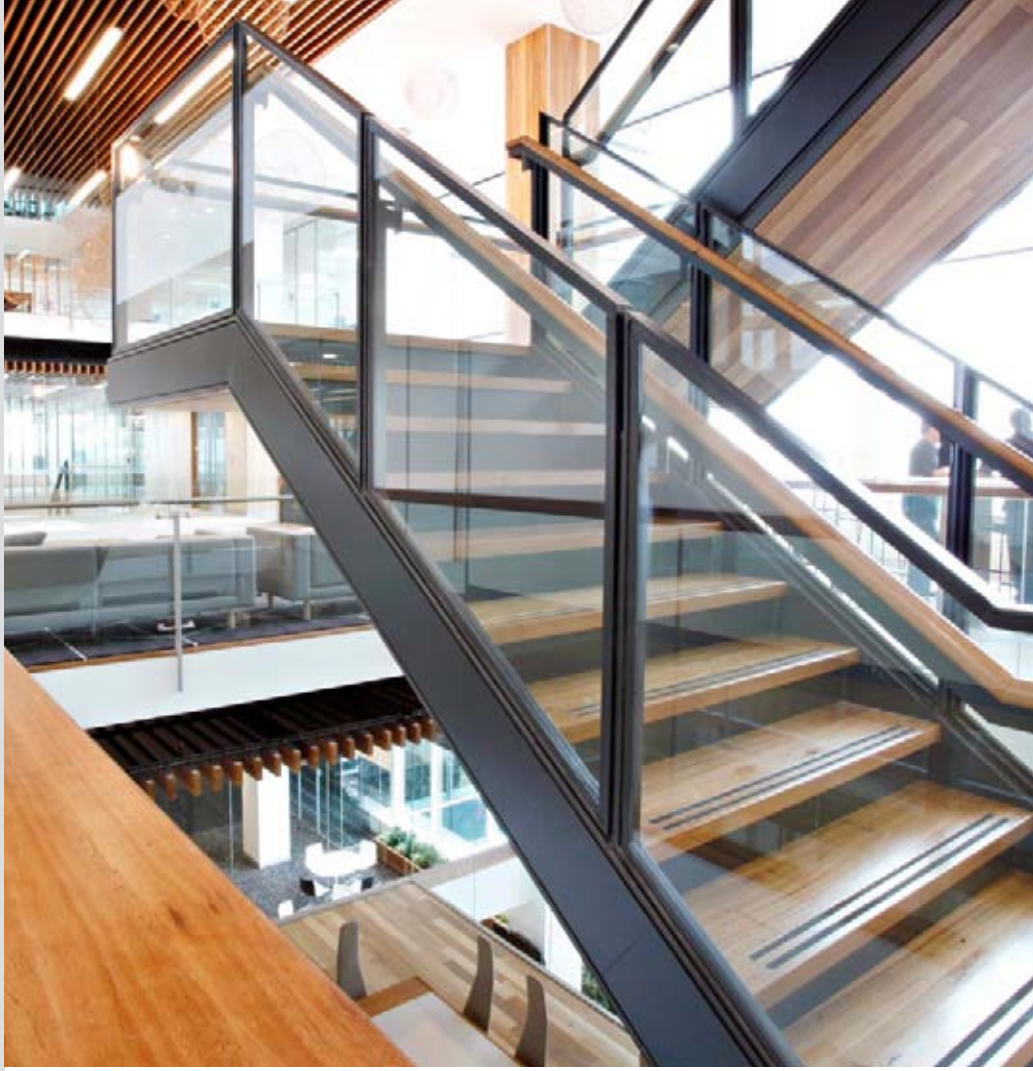

Figure 1. P2 Feature PFC illustrative example of RHS U shaped staircase format. Balustrade not shown. A wide variety of balustrade styles (documented in other Arden brochures) can work with the P2 stringer / staircase design.

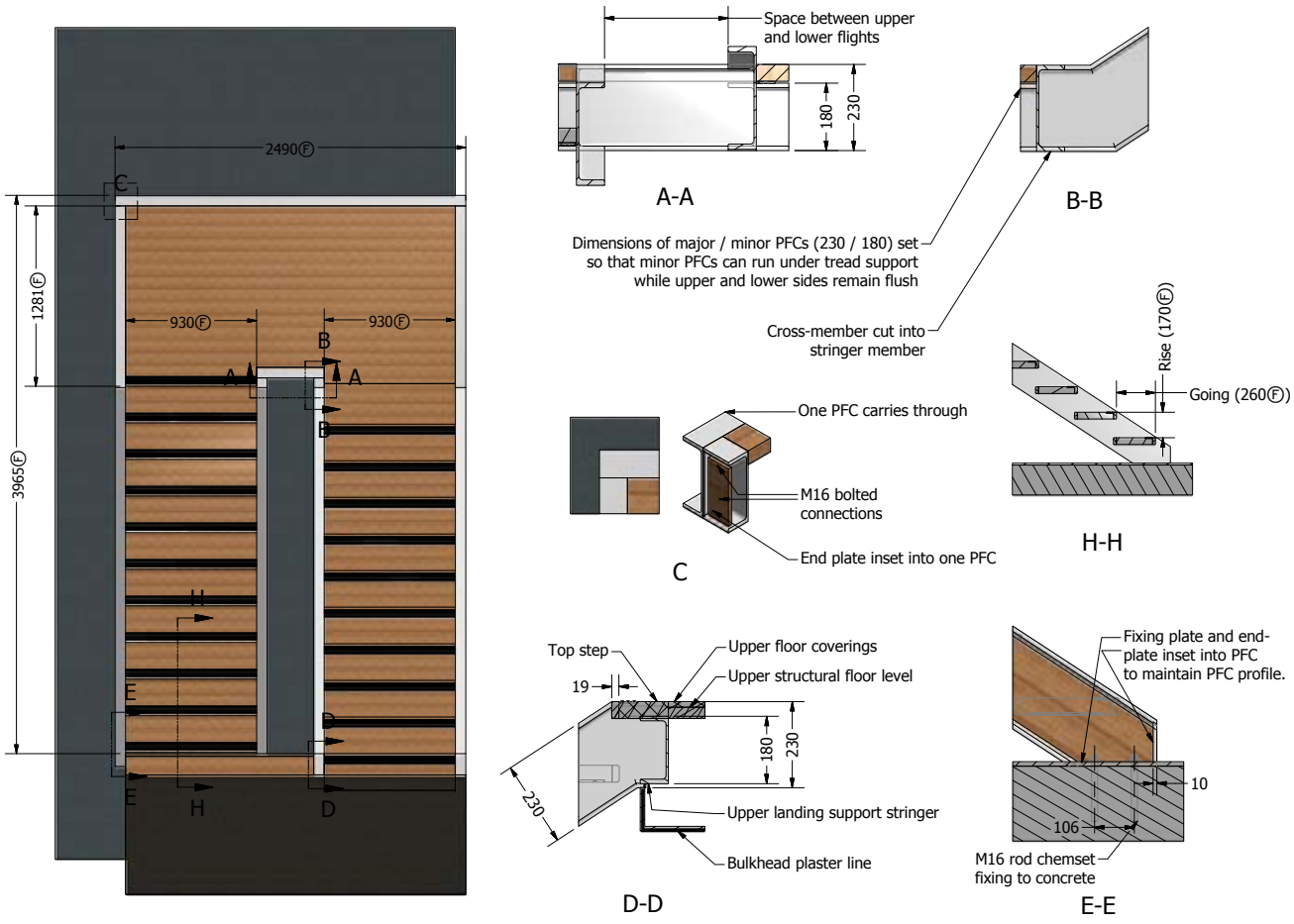

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Figure 2. Plan view and details. Sections A-A and B-B show how the use of smaller grades of PFC for the under-landing supports integrates with the main stringer members to set the bottoms of the members flush, as well as the top face of the main members and the tread surface. Detail C shows the M16 bolted connections at the 90 degree corner intersection of main landing supports. A mitred corner detail is also possible.

As section H-H shows, the illustrative example shown here works on a 170 rise and 260 going which are quite typical in a commercial installation. Section D-D illustrates the connection of the upper flight stringer with a PFC-supported top landing structure. The 180h top landing support PFC is painted and positioned with respect to the plaster with a typical shadow line detail. Finally, section E-E details a typical bottom floor fixing to concrete slab using M16 rods at 106mm separation.

Ⓕ indicated on dimensions denotes a nominal dimension that typically varies according to specific application, engineering requirements or client preferences.

technical

PFC (parallel flanged channels) are a standard structural steel component, similar to more standard items such as universal beams and columns. Hot formed sections such as PFC's offer an "off the shelf" structural solution to a number of application with staircases being one of those applications that are particularly apt.

In staircases, the size of the PFC is determined by its structural duties and varies according to application from 300PFC (300x90) down to 185PFC (185x70).

The major advantages of the use of PFCs as stringers are:

a) Engineered structural properties including torsional and lateral strength.

b) Ease in fabrication in that it is straight and provides one face for the simple welding of steel tread cleats, steel tread supports, folded steel tread and riser assemblies and the like.

c) Balustrade application to a PFC typically takes advantage of the flat top of the pfc (The flange) although other, (typically more complicated) solutions are possible to the open channel side of the PFC.

Whilst PFC stringers offer a simple engineering solution for stringers in most applications, thought needs to be applied to how this may affect the styles available for a balustrade solution.

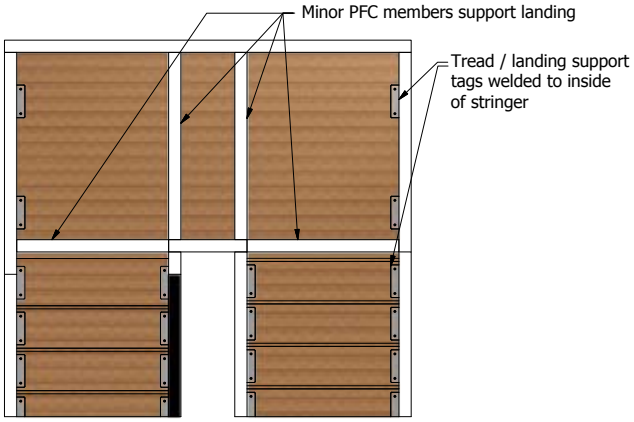

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Figure 3. Bottom plan view showing the use of welded tread-support tags and minor PFC members to support the landing. Actual number and details of support fittings depending on dimensions of staircase and type of tread design selected.

Figure 4. Exploded isometric summarising structure and construction methods. Details F and G illustrate welded joins between PFC members, with cut-outs required to fit one member to another. Detail J shows the tread and landing construction in this particular example, incorporating a solid timber body, inset support plate and non-slip strip, and applied nosing. A wide variety of tread and landing designs may be combined to the P2 stringer design, please refer to the appropriate Arden brochure for details.

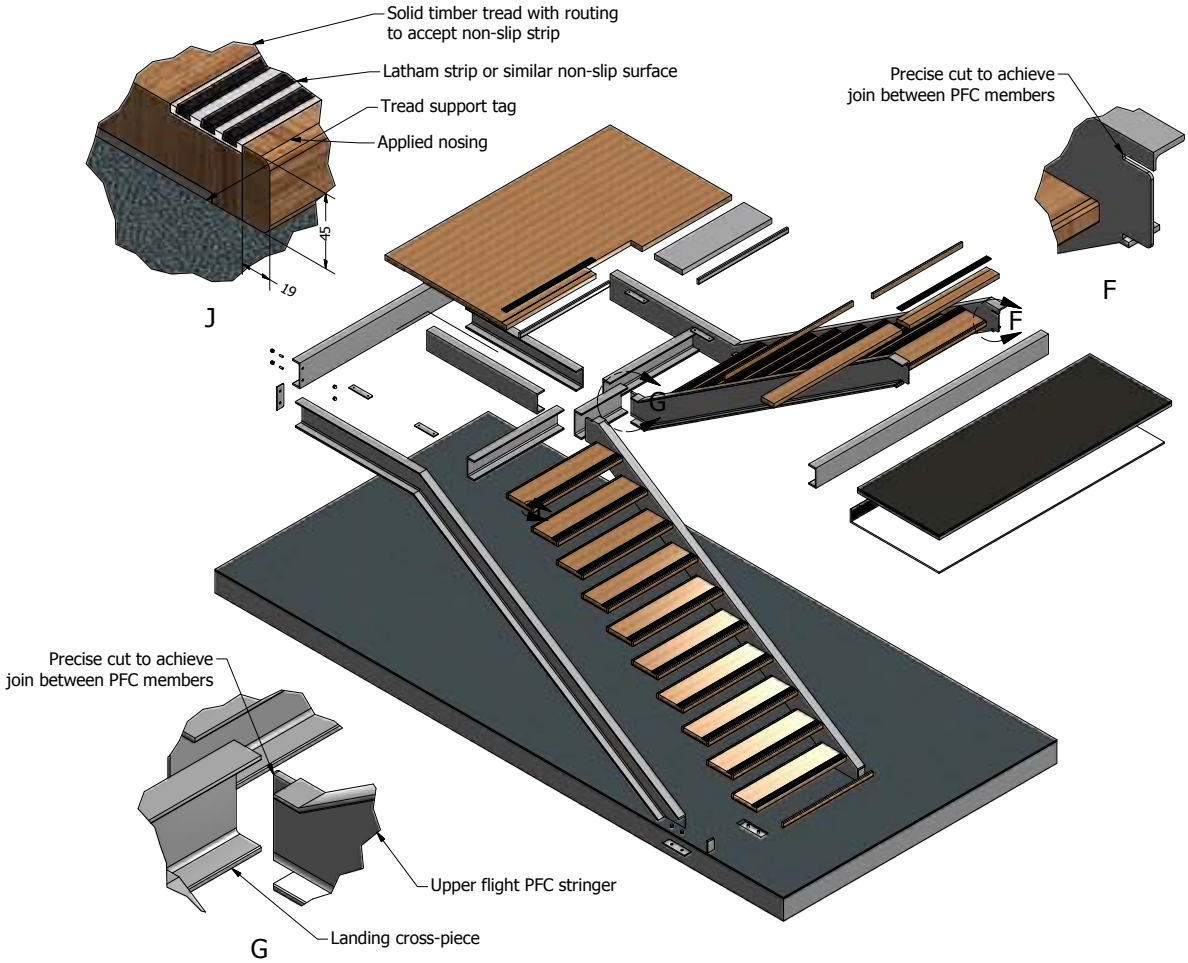

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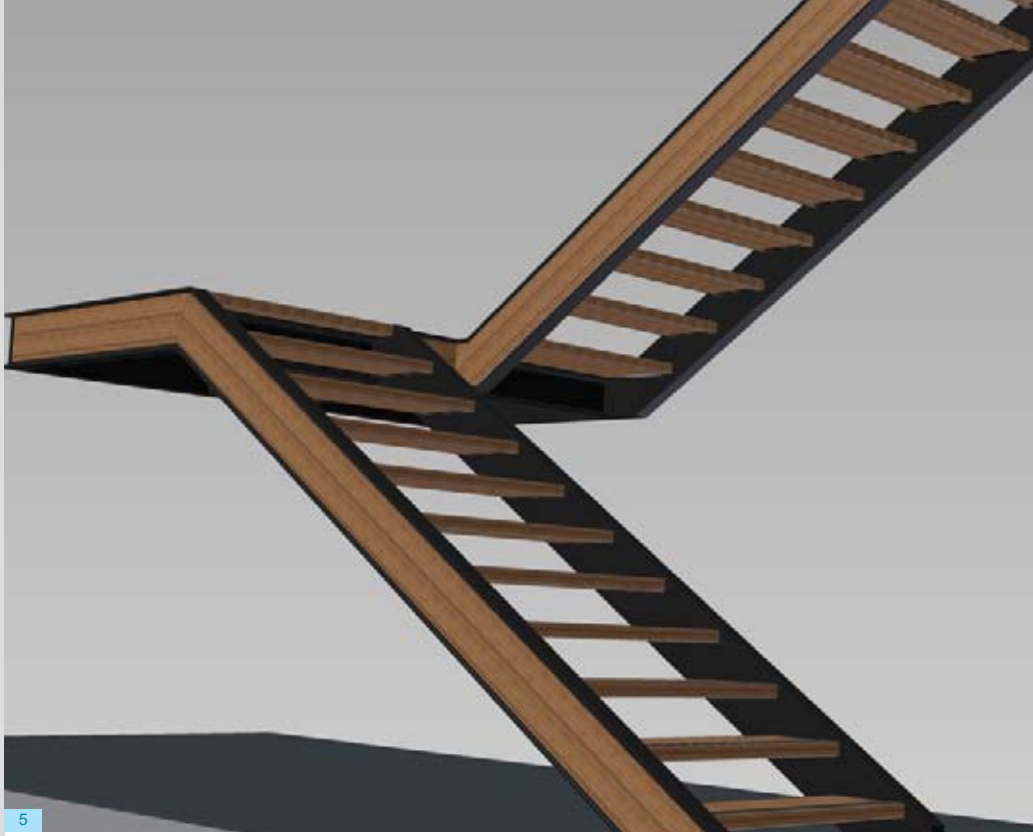
Figure 5. Design variant of the P2 when a more refined finish is desired. Feature timber panelling installed flush with the outer face of the main PFC members, and with a shadow line between the timber and the steel flange edge.



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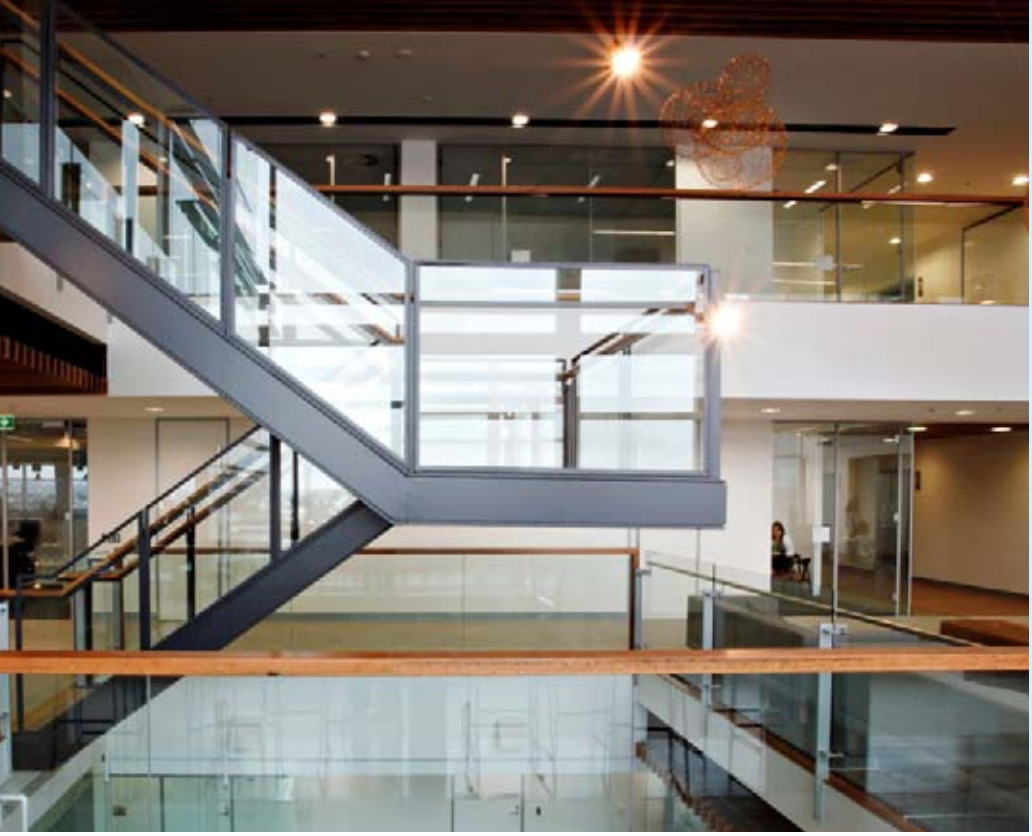

compliance

Arden is a BSA licensed contractor for carpentry, joinery, glass, glazing and aluminium as well as structural metal fabrication and erection. Arden supplies a Form 16 (Licensed Contractor) on all projects. In design and construct contracts, a Form 15 (Design Engineer) certification is supplied upon request. For products and services incorporating the P2 system, this table shows compliance with relevant codes and standards.

Key

- ● full compliance with the code
- ◑ can comply
- ○ not applicable to this element

Code	Title	Applicability
BCA	The Building Code of Australia	●
AS NZS 1170.1	Structural Design Actions – Permanent, imposed and other actions	●
AS 1288	Glass in Buildings. Selection and installation.	○
AS NZS 1554.1	Structural steel welding - Welding of steel structures	●
AS 1554.6	Welding stainless steels for structural purposes	●
AS NZS 4586	Slip resistance classification of new pedestrian surface materials	◑
AS 1428.1	Design for access and mobility	◑
AS 1657	Fixed platforms, walkways, stairways & ladders. Design, construction and installation	●

design note

For all commercial applications, it is important that sufficient space for the stairwell cavity be allowed to satisfy Australian Standards and BCA requirements.

The footprint is primarily driven by the floor to floor rise, as well as the staircase configuration chosen. However, stringer and balustrade style design may increase the amount of space required. Allowing too small a cavity can restrict the design options of the staircase. Also, points at where the staircase interacts with other structures are best addressed early in the design cycle.

Consultation with Arden early on will help ensure that these design issues can be addressed in a cost-effective manner.

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