

PD³TM Dowel Cradle

Load Transfer System
INDUSTRIAL SLAB ON GROUND

- ✓ Provides the flattest joints
- ✓ Assists in reducing long term maintenance costs
- ✓ Extends the life-cycle of the floor and the asset
- ✓ Engineered to meet Super Flat Floor (SFF) requirements, ACI 360-R10

Product Description

The patented PD³™ design features a tapered and sleeveless plate dowel that provides the world's best performance in limiting joint deflection to provide superior joint stability. The PD³™ Dowel Cradle provides the highest deflection control tolerance in line with ACI Standards recommendations to limit joint spalling, facilitate load transfer and provide the lowest risk of restraint to ensure the best serviceability outcome for the slab design. The use of the PD³™ system extends the life-cycle of the floor to provide the highest level of floor efficiency for tenants and the highest return on investment for the asset owner.

PD³™ Dowel Cradles are designed to provide a total contraction joint system solution by incorporating two systems in the one solution. The tapered PD³™ dowels that allow for lateral movement eliminating the need for a plastic dowel sleeve and the wire cage that acts as a chair and spacer to ensure the dowels are aligned and maintained at the correct height and spacing during the pouring of the slab.

The elimination of the plastic sleeve from the dowel ensures direct concrete to steel contact which provides the best possible control of load deflection by eliminating the crush factor of the plastic and providing a tighter control tolerance than other sleeved plate dowel systems.

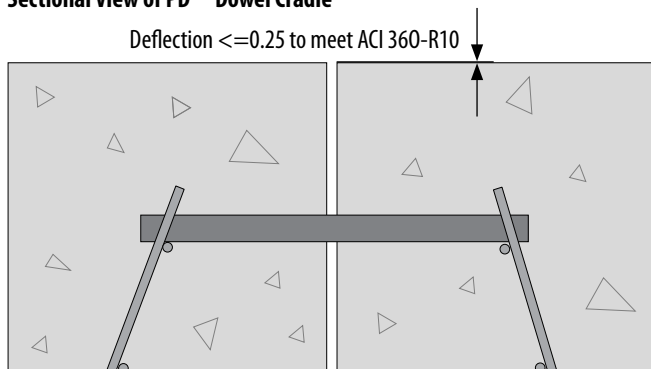
Slab Deflection

Dowel Plate to Concrete Direct Contact

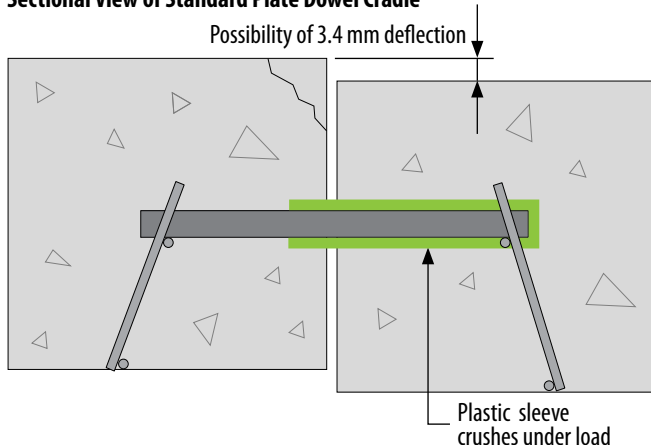
The PD³™ Dowel Cradle tapered shape allows for the lateral movement of the dowel without the need for plastic sleeves to create cavities.

The absence of a plastic sleeve allows direct contact between the steel plate and the concrete therefore providing minimal chance of deflection, greatly reducing the risk of damage to the joint edges.

Sectional View of PD³™ Dowel Cradle



Sectional View of Standard Plate Dowel Cradle



Please Note: These drawings are not to scale but illustrational to highlight potential load deflection.

Features

1. The PD³™ Dowel Cradle features a plate dowel with bond breaker allowing concrete to steel contact.
2. The PD³™ Dowel Cradle utilises a tapered plate dowel that allows lateral movement without the use of a plastic sleeve.
3. The wire cradle construction ensures the accurate placement and alignment of the plate dowels at the correct centres and height within the slab.

Advantages

- No plastic sleeves required.
- Direct steel contact allows superior load deflection control.
- Engineered to meet Super Flat Floor (SFF) requirements, ACI 360-R10.
- The use of the PD³™ Dowel Cradle creates a lateral and longitudinal movement void.
- Reduces the risk of restraint.
- Provides fast and accurate horizontal and vertical placement.

PD³™ Dowel Cradles superior engineered performance controls floor flatness limiting joint spalling.

Benefits

Concreter Benefits

- Speed and accuracy of dowel placement.
- Lowest placement cost.
- Ensures the flattest floors at the joint.
- Pour through capability.
- Greater stakeholder satisfaction.

Engineering Benefits

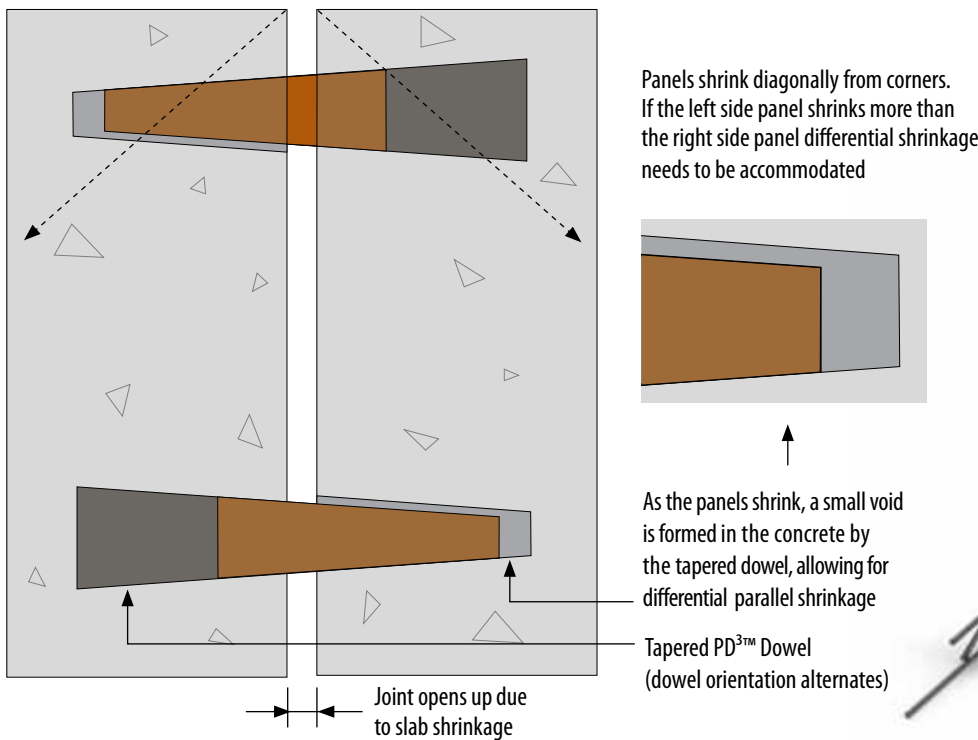
- Provides highest performance in controlling joint deflection.
- Compliance with ACI 360-R10, design recommendations.
- Delivers flatter joints, FF and FL, ACI 117.
- Accuracy of dowel placement ensures the most effective load transfer performance.

Asset Protection Benefits

- Reduces the risk of spalling damage to the concrete at the joints.
- Reduces floor maintenance and downtime costs over the life-cycle of the facility.
- Reduces wear and tear on tenants materials handling equipment.
- Provides a smoother floor surface at the joints which ensures tenant efficiency.
- Increases tenant satisfaction and return on investment.



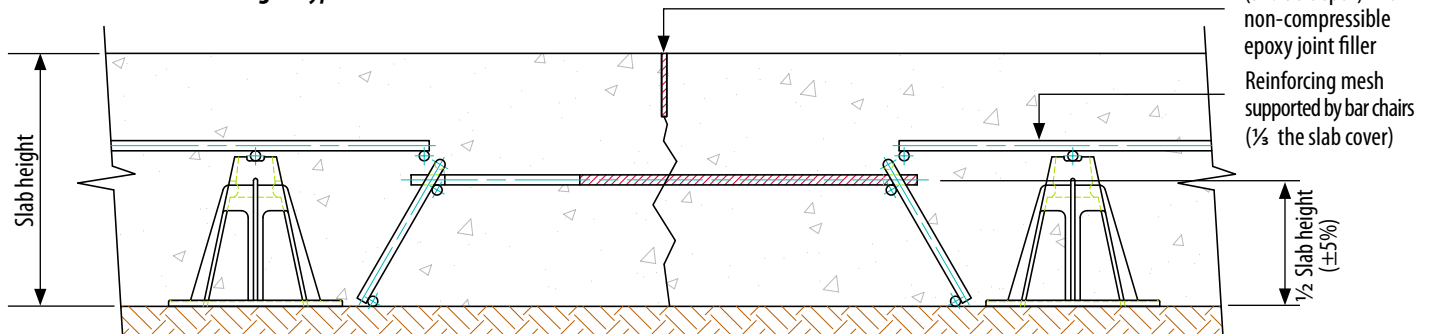
Lateral Movement Of Dowels (Plan View) - How PD³™ Dowels provide lateral and longitudinal shrinkage



ACI 360-R10 States (Chapter 6.2 - Load Transfer Mechanisms)
“Joint and crack stability measurements below 0.25 mm for joints or cracks subjected to lift truck traffic with small hard wheels will have good service life”



Mesh Reinforced Slab Design - Typical Install



Material Technical Data

COMPONENT	DIMENSION (mm)	MATERIAL TYPE	MATERIAL STANDARDS	STEEL GRADE EQUIVALENT	YIELD STRESS (MPa)	TENSILE STRENGTH (MPa)	STANDARDS COMPLIANCE
6 mm Dowel	6 x 300	Cold Drawn Steel	Q345	≥ Grade 300	345	550	AS/NZS 3679.1
10 mm Dowel	10 x 300	Cold Drawn Steel	Q345	≥ Grade 300	345	550	AS/NZS 3679.1
Wire Cage	Ø5.4	Hard Drawn Wire	AS/NZS 4671	Grade 500L	500	650	AS/NZS 4671
Travel Bars	Ø4	Ribbed Wire	AS/NZS 4671	Grade 500L	500	625	AS/NZS 4671

Manufacturing Tolerances (Standard Sizes)

OVERALL LENGTH	±10 mm	OVERALL HEIGHT	±5 mm	DOWEL CENTRES	±5 mm
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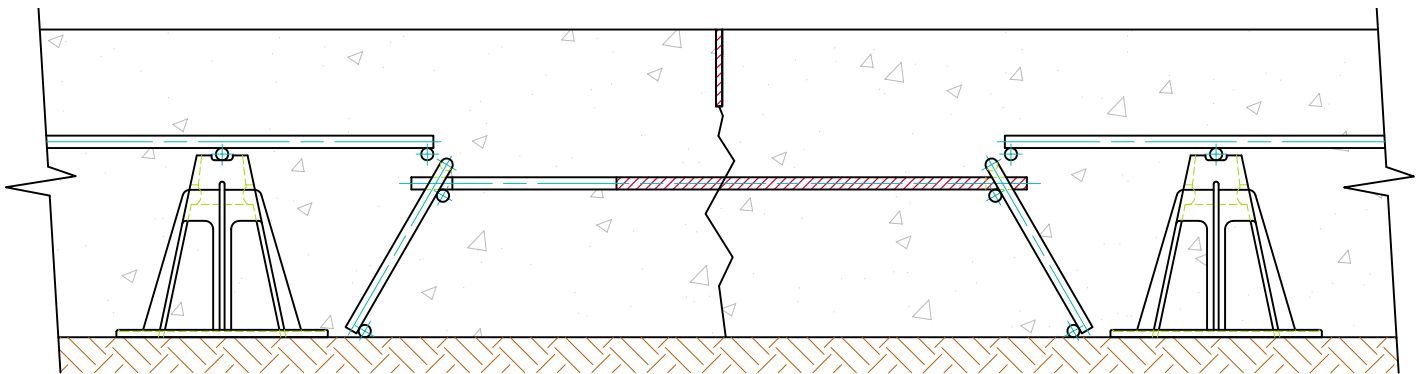


Installation Guide



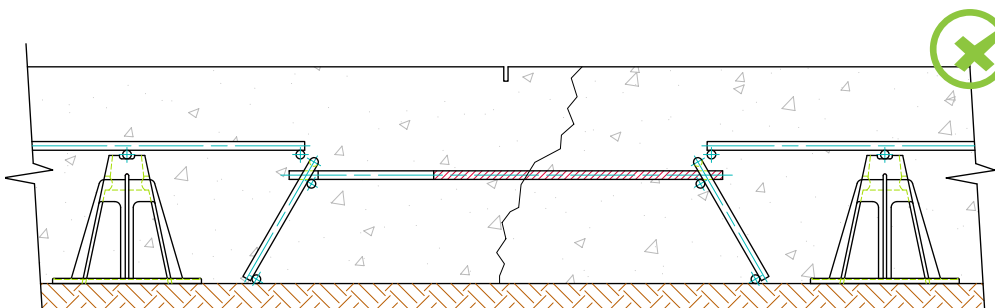
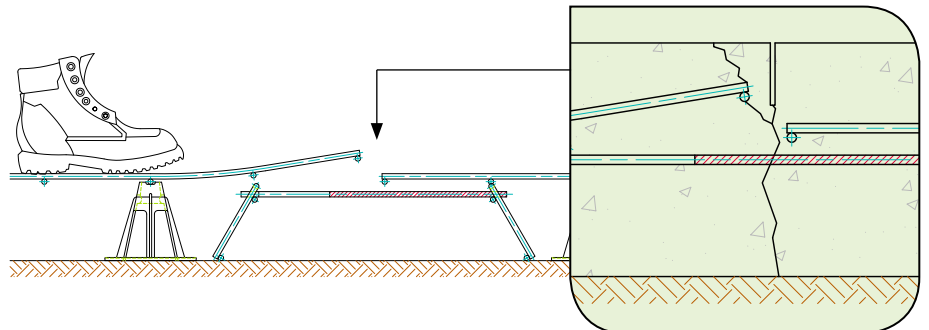
Correct Cradle installation:

1. Saw-cut approximately $\frac{1}{4}$ of slab depth.
2. Dowel height at $\frac{1}{2}$ slab height.
3. The mesh should be supported by bar chairs to rest approximately $\frac{1}{3}$ of the slab height.
4. Bar chairs should keep the mesh parallel at consistent depth.
5. Bar chairs should be as close to the cradle as practical.
6. Mesh should not overhang past the edge line of the cradle.
7. Mesh should not touch the edge of the cradle, allowing concrete flow between the mesh and the cradle.

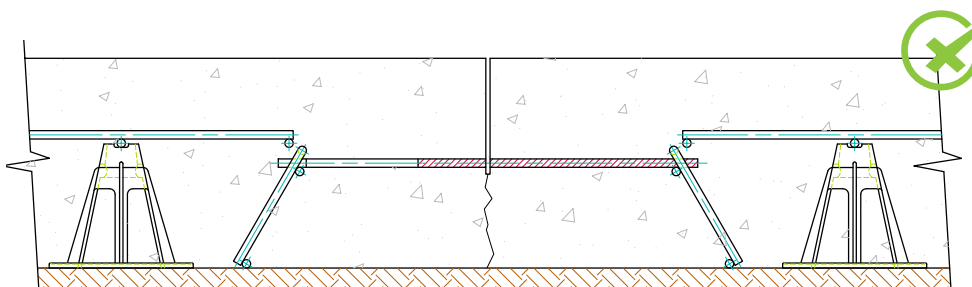


Incorrect Cradle Installation:

1. Mesh is too close to top surface of the slab.
2. Mesh is too close to the line of the saw cut.



Saw-cut too shallow to be effective, the crack has not generated from the top of the slab therefore the crack has found its own path to the surface.

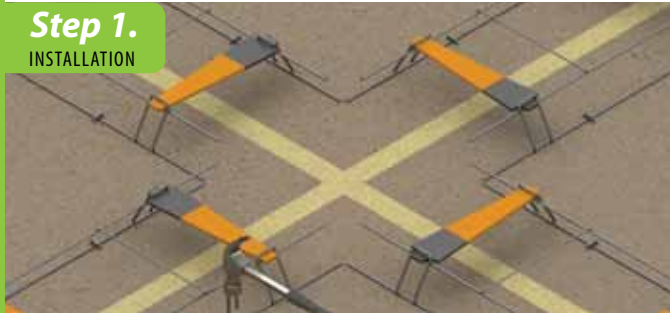


Saw-cut too deep, the load transfer system has been cut and therefore has rendered it ineffective in controlling deflection.

Installation Process

TOOLS REQUIRED: Mark Out Paint | Hammer | Wire Cutter

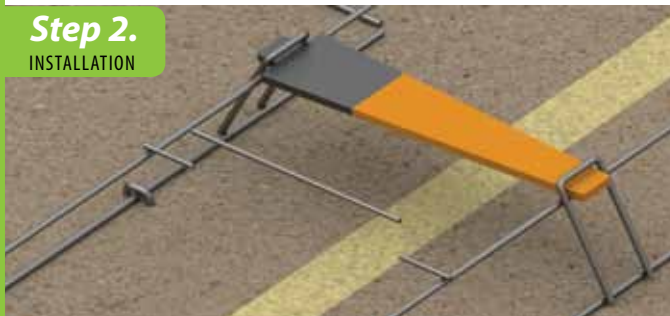
Step 1. INSTALLATION



- Mark out joint lines on sub-grade with mark out paint to allow straight and accurate placement of PD³™ Dowel Cradles.
- Place cradles along mark out lines with the PD³™ dowel centred over joint line. Place cradles end to end ensuring dowel spacing is maintained at correct specified spacing. Cradles can be cut to provide infill lengths. Optional Danley™ Hold Down Stakes can be used to secure the cradles in position for the pour.

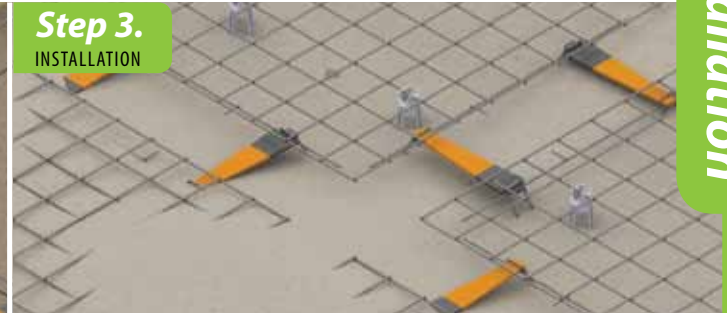
Important: Do not run cradles through intersections. See intersection positioning diagrams below for correct layout.

Step 2. INSTALLATION



- Prior to the pour, cut the 4 mm travel bars (3 cross wires that hold the wire frames together). Failure to do so may lock the joint.

Step 3. INSTALLATION



- The mesh should be supported by bar chairs to rest approximately $\frac{1}{3}$ of the slab height. Make sure mesh is placed back from the joint line (in line with the edge rail of the cradle), do not place directly on the cradles.
- Pour through concrete, ensuring that both the cradles and the reinforcement are not displaced.

Step 4. INSTALLATION



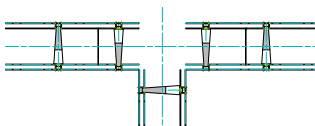
- Form the joint with a soffcut (1/4 slab depth) as soon as the concrete will support the saw and operator. This is usually within 2-4 hours of the last pass of the power trowel.

Dowel Application Key Points

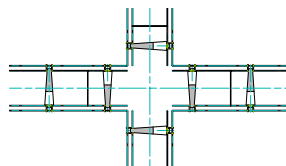
- Dowels are needed to reduce the differential deflection between adjacent panels so that lift truck wheels do not create joint spalling resulting in high maintenance and rectification costs.
- Joint spalling is the critical failure mode of the joint. Joint systems should be designed for serviceability (rather than ultimate load).
- Dowel selection should be based on the floor flatness tolerance required.
- Control of deflection and cracking without reducing slab strength should be the key design factor.
- Concrete strength is generally the controlling factor after the deflection control considerations.
- The dowel systems should never introduce risk of restraint and uncontrolled cracking at any time.
- Oversized and over strength dowel systems raise the risk of concrete bursting. Dowel systems should maximize the load at the slab edge and minimize the bursting risk past the joint.
- Danley™ Systems consider the correct type and amount of doweling required to control deflection for the type and rated capacity of the lift truck to be used.

PD³™ Dowel Cradle Positioning

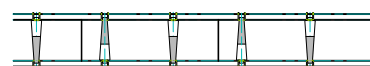
3-Way Intersection Detail



4-Way Intersection Detail



Standard Length Detail

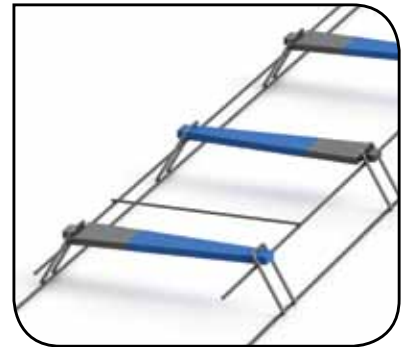


How to write a Specification

Product specification for PD³™ Dowel Cradle consists of:

PRODUCT CODE, DOWEL THICKNESS, DOWEL CENTRES, SLAB HEIGHT and FINISH (Black or Galvanised)

e.g: **PD306450150B**

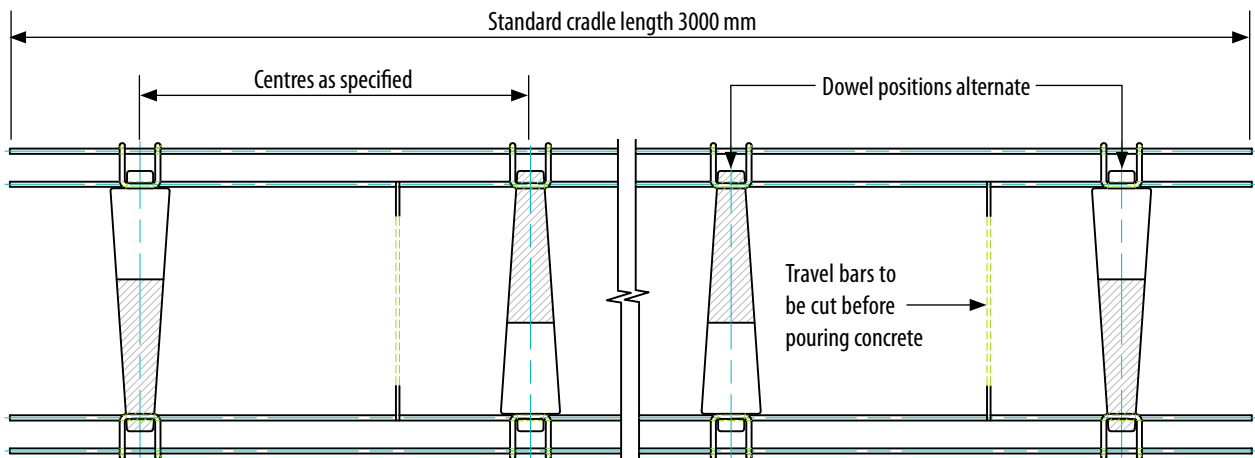


REQUIRED INFORMATION

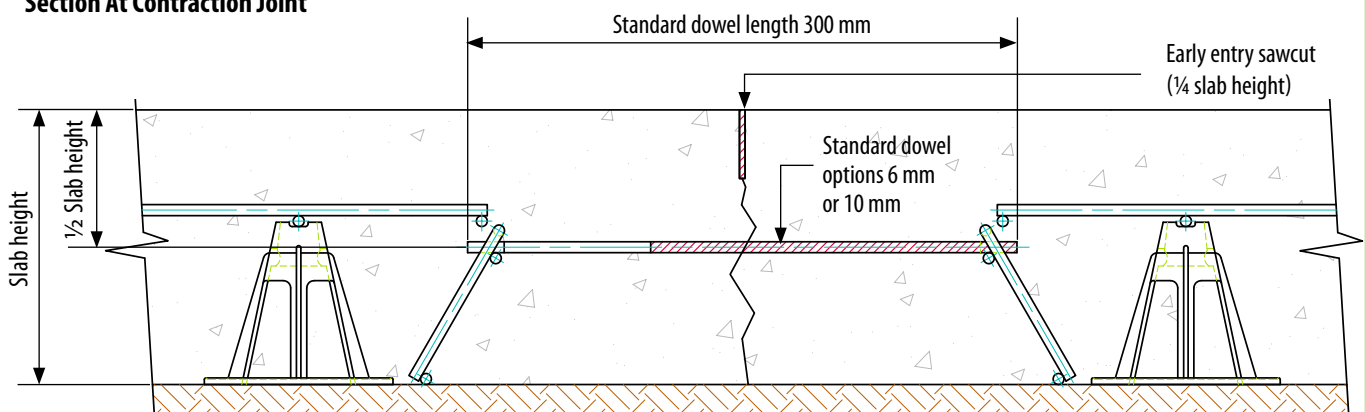
For quoting or manufacturing the following formation is required:

Danley™ Product Code			Dowel Thickness		Dowel Centres			Slab Height			Dowel Finish B/Galv.
P	D	3	0	6	4	5	0	1	5	0	B

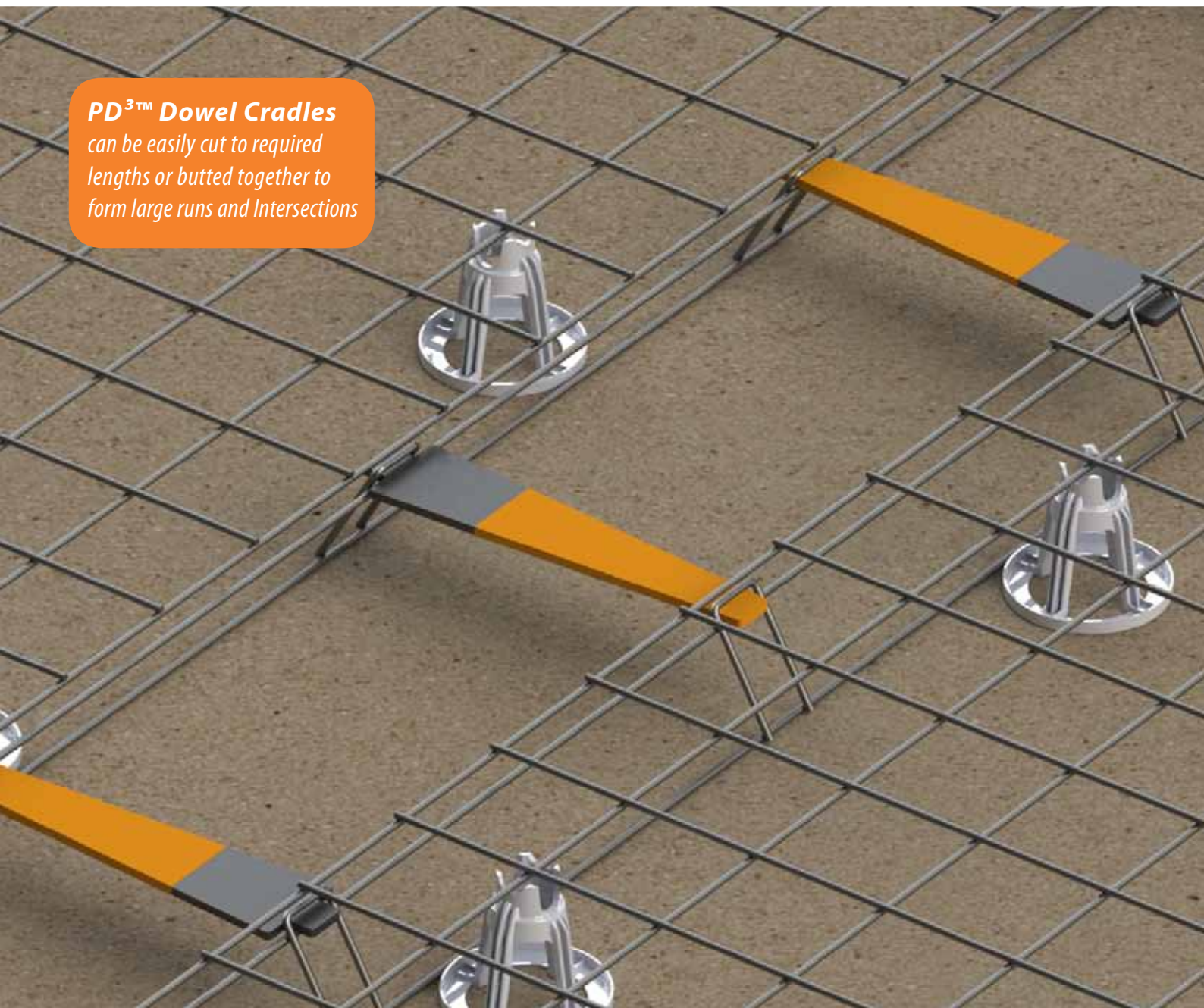
Plan View



Section At Contraction Joint



PD³™ Dowel Cradles
 can be easily cut to required
 lengths or butted together
 to form large runs and Intersections



PD³™ Dowel Cradle Panel Layout

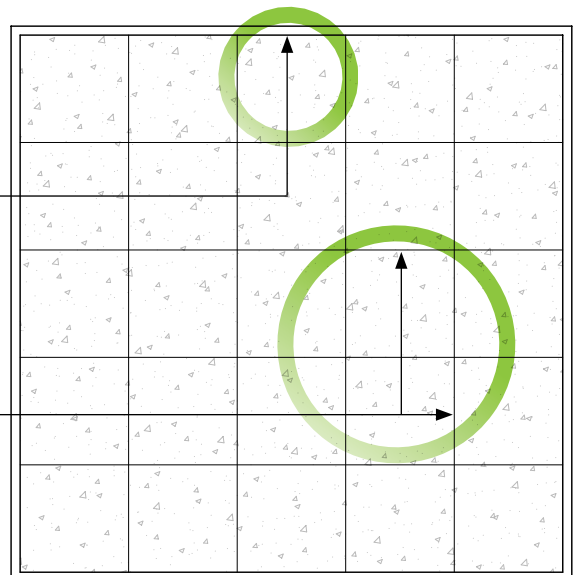
Construction Joints

ArmourMate™ or loose dowels (Diamond™ Dowels) positioned around the perimeter of each concrete pour.



Contraction Joints

PD³™ Dowel Cradles positioned at the soffcut joint lines.



Typical 30 x 30 meter slab panel.



Companion Products



1. ArmourMate™

For edge protection of construction joints, Danley™ ArmourMate™ provides a range of solutions to best prevent damage and joint spalling associated with impact from materials handling equipment and other traffic. Joint edge protection systems can be incorporated into Danley™ full joint solutions with sacrificial formwork and load transfer systems.

2. Diamond™ Dowel

Diamond™ Dowels are plate dowels suited for construction joints in concrete slabs and pavements. They transfer vertical loads across the joint and minimise differential deflection between adjacent slab panels under load. Easy to install they attach directly to wooden formboard or metal separation plates. They come pre-packaged with all components ready for installation.

3. Crack-A-Joint™

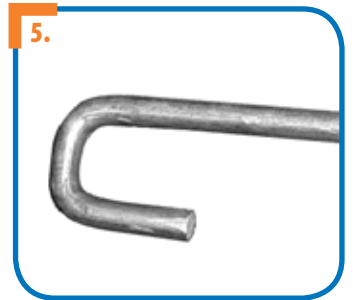
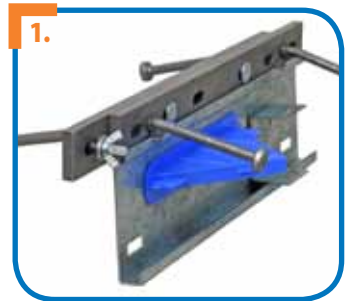
As an option to saw cutting, place Crack-A-Joint™ into the wet concrete along the joint line (above the centre of the PD^{3™} Dowel Cradle), to induce a crack for the full depth of the concrete. The Crack-A-Joint™ is available in standard 3 m lengths formed from galvanised sheet steel to a height of 25 mm. It can be supplied as a plain joint or with a permanent Rip-A-Strip™ capping in three different colour options (Black, Grey or Sandstone).

4. Ground Crack Inducer

An inverted V-shaped PVC extrusion, 3 m long and available in 25 mm and 50 mm heights. It is positioned on the sub-grade before the PD^{3™} Dowel Cradles are placed. It produces a weakening in the slab that initiates a crack from the bottom up. Ground Crack Inducer is optional and should only be used when Crack-A-Joint™ is used, or when saw cuts are to be made in the slab on the same day as the slab is poured.

5. Cradle Hold Down Hook

A small optional wire hook that allows you to anchor the base of your Cradles into the site sub-base. It prevents the PD^{3™} Dowel Cradles from moving during the pour process. They hook over the bottom wire of the Cradles securing them to the ground.



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