

DINCEL STRUCTURAL WALLING

ALTERNATIVE TO TO TILT UP & PRECAST
FACTORY WAREHOUSE

PATENTS

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FACTORY/WAREHOUSE CONSTRUCTION

These types of structures usually consist of metal sheeted roof. The walls consist of either full height concrete walls (conventionally either tilt-up or precast panels) or Dado Walls.

Dado Walls

This is the most cost effective wall construction in factory/warehouse type buildings. It is normally used where walls do not require a fire rating; hence the use of metal sheeting. Dado walls are typically 2m to 3m in height of solid wall construction to satisfy the building's security needs. The above walls become metal sheeted walls.

Full Height Walls

The need for full height solid walls around the building's periphery arises because of fire rating, i.e. proximity of the walls to the site boundary.

The fire requirement of the walls can change depending on the type of building, distance from the boundaries, and whether the external wall is load bearing or not.

The requirements can be no fire rating as in the case of Dado Walls or 1.5 hours or 4 hours.

Conventionally, full height walls are achieved by adopting either precast panels with portal framed steel structures or tilt-up wall panels.

The tilt-up panel concept has found its place in the construction industry for two reasons:

- (1) The steel columns of portal frames occupy considerable clear useable space.
- (2) More importantly, off-site precast wall manufacturing capability cannot cope with the demand, especially in buoyant construction periods.

As a result, rather large precast panels are prepared on-site and tilted up into final position with the use of large cranes.

This type of construction always causes safety risks, hence is required to be handled by specialist trades. ([Download – Dincel Solution for Construction Safety](#))

WHY DINCEL IS SUPERIOR TO TILT-UP CONSTRUCTION

DinCEL Construction System presents a clear advantage over tilt-up for the following reasons:

- DinCEL is a clearly FASTER and SAFER system to build with.
- Wet weather reliability.
- No need for craneage, all man handled light weight modules.
- Site access reliability for heavy equipments such as cranes, especially in wet weather conditions.
- Eliminates the skilled workmanship and labour requirements.
- No need for elaborate and expensive casting beds as floor slabs and base course preparation below the floor slabs which in turn need to carry heavy crane loadings for installation purposes.
- Floor slabs can be poured last after the erection of the roof and walls. This will ensure that the floor slab is protected against accidental or shrinkage/temperature related damages during construction.
- The floor slab does not need to be accurate to act as a casting bed for tilt-up walls.
- The floor slab does not need to be as thick and reinforced as in the case of tilt-up walls.

A 200mm DinCEL Wall provides 4 hours fire rating and can be installed either in a VERTICAL or HORIZONTAL direction. In fact the exact TILT-UP methodology can be duplicated and the only difference being that DinCEL forms are placed and filled in-situ. The tilt-up wall panel principle aims at not having an outward collapse of the wall panels during a fire event. (Non-fire rated roof members collapse first and pull/push walls during a fire). However, tilt-up panels collapse individually. Due to their monolithic nature, DinCEL Wall acts as one complete panel consisting of the entire face of the building. As a result the risk of collapse of DinCEL panels under a fire will be less than tilt-up walls.

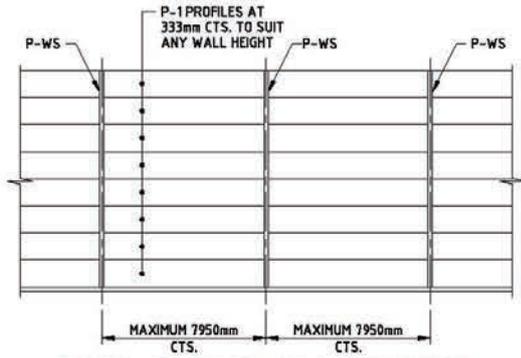
The following methodology, unique to DinCEL, is recommended because of the following:

- Eliminates or minimises the need for bracing to concrete fill DinCEL Walls.
- Eliminates the conventional SAFETY RISK OF TILT-UP PANELS.
- Walls can be poured in a continuous or delayed manner to suit the builder's program.
- DinCEL Walls can act as deep beams without the need for additional footings.

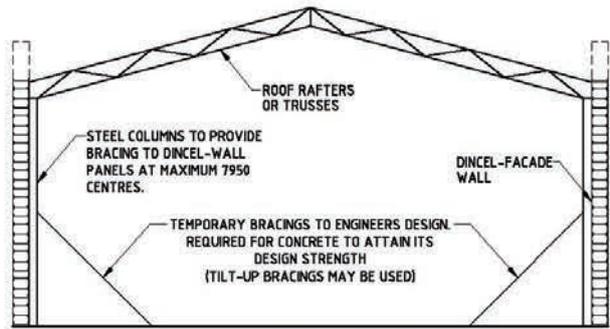
The recommended installation of full height walls may take place as follows:

- (i) Provide appropriate footing structure. The footing structure may consist of piers, levelling strips or even floor slabs.
- (ii) Erect structural steel skeleton consisting of purlins, trusses (or rafters) and lightweight steel columns to receive DinCEL-Façade walls. (Refer following details headed "Full Height Wall Construction").
- (iii) The following details show horizontally placed DinCEL Panels. DinCEL Panels can also be placed in a vertical direction of up to 7,950m or spliced in two pieces to suit, say 9m or 10m wall height.
- (iv) Start placing DinCEL-Wall in horizontal layers of maximum six (6) profiles (i.e. 6 x 333mm = 2,000mm). Pour first layer of 1.0m maximum in height of concrete, and then continue with 2m height lifts from mobile scaffolding.
- (v) Concrete placement with horizontally laid panels is important. Place maximum 75mm boom pump line into DinCEL panel and pour as a tremie method. Using 25mm vibrators will ensure that each maximum 2,000mm lift is fully concreted.
- (vi) Repeat Item No: (iii) in layers until required height is achieved. It is recommended to have a minimum of one (1) hour between each pour. Maximum of 6m concrete pour height is limited to each day's concrete pour.
- (vii) It is recommended to place vertical dowel bars, say N12 @ 1000 cts – 1000 long at pour breaks where cold joints between concrete pours may possibly occur.
- (viii) If rafters are placed at, say 10m intervals, DinCEL-Panels at 5m lengths with intermediate wind columns can be adopted.

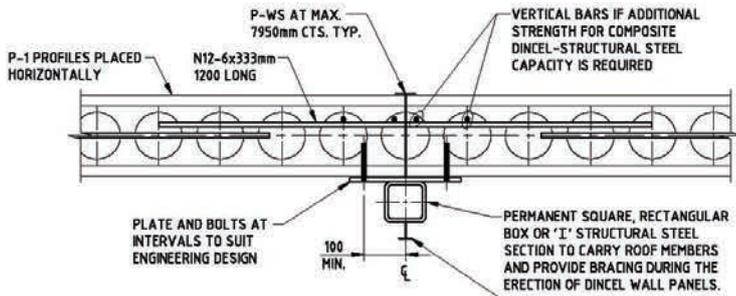
FULL HEIGHT WALL CONSTRUCTION



DINCEL-FACADE WALL ELEVATION

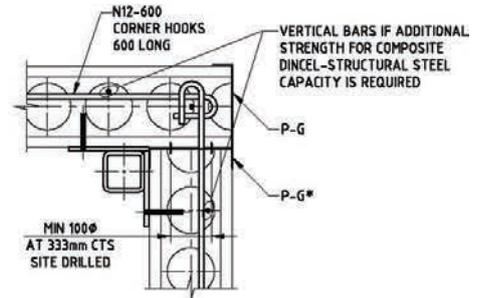


TYPICAL FACTORY CROSS SECTION



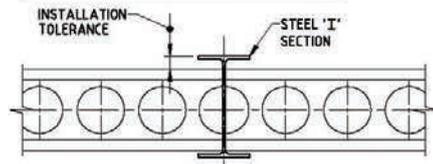
PLAN DETAIL AT P-WS

NOTE: HORIZONTAL WALL REINFORCEMENT IS TO BE PROVIDED AT EVERY 2ND DINCEL PROFILE, ATTACH THE BARS TO DINCEL PROFILES BEFORE INSTALLATION

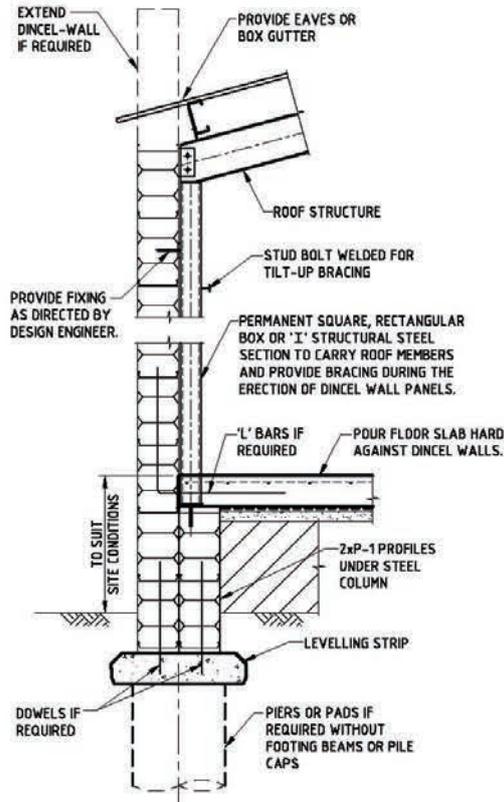


CORNER DETAIL

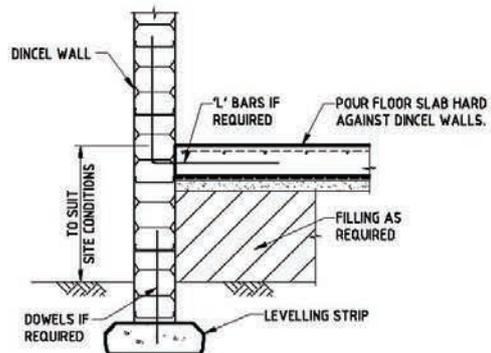
CONCRETE TO BE MINIMUM 20MPa, AND 10mm AGGREGATE
 180mm SLUMP - HORIZONTALLY PLACED DINCEL WALL
 120mm SLUMP - VERTICALLY PLACED DINCEL WALL



OPTIONAL DETAIL AT P-WS



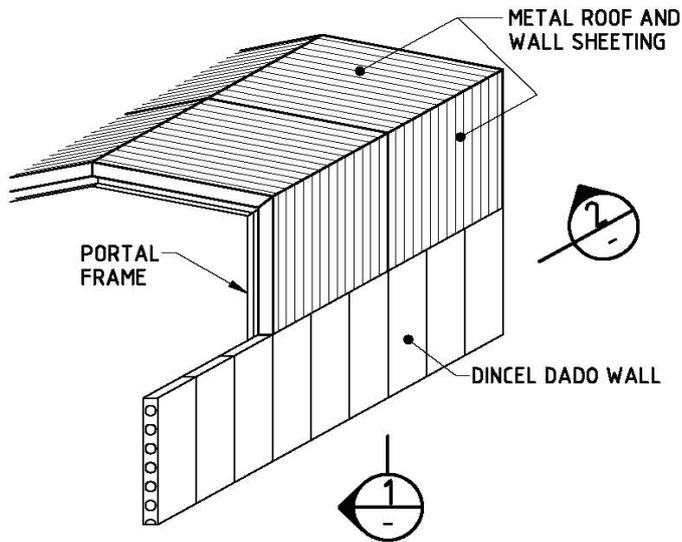
FOOTING DETAIL AT STEEL COLUMNS



FOOTING DETAIL

DADO WALL CONSTRUCTION

BENEFIT: PRECAST WALLS ARE REQUIRED TO BE PLACED BEFORE THE PLACEMENT OF WALL GIRTS AND FASCIA PURLINS, HENCE RIGGERS MUST COME BACK TO THE PROJECT AFTER THE INSTALLATION OF PRECAST WALLS. DINCEL IS INSTALLED WITHOUT THE NEED FOR CRANAGE, ALLOWING THE RIGGERS AND DINCEL WALL INSTALLERS TO WORK SIMULTANEOUSLY WHICH ELIMINATES THE LOSS OF TIME ASSOCIATED WITH PRECAST WALLS.

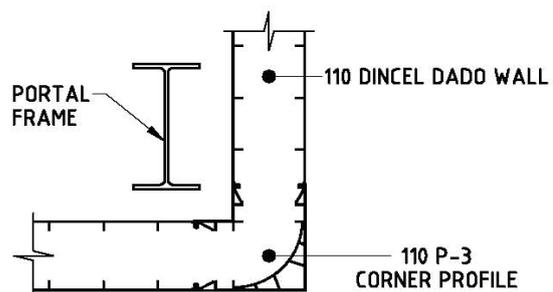


**ISOMETRIC VIEW
FACTORY/WAREHOUSE**

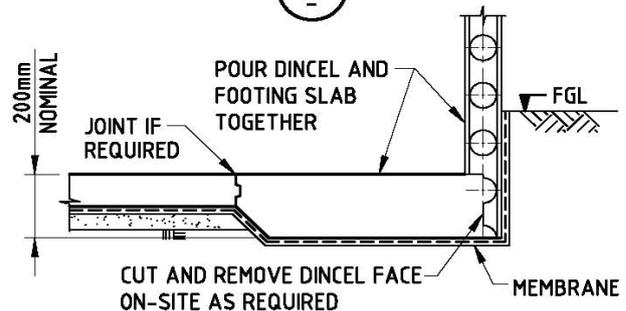
CONCRETE IN DINCEL WALL TO BE 20MPa,
120mm SLUMP AND 10mm AGREGATE

CONSTRUCTION SEQUENCE

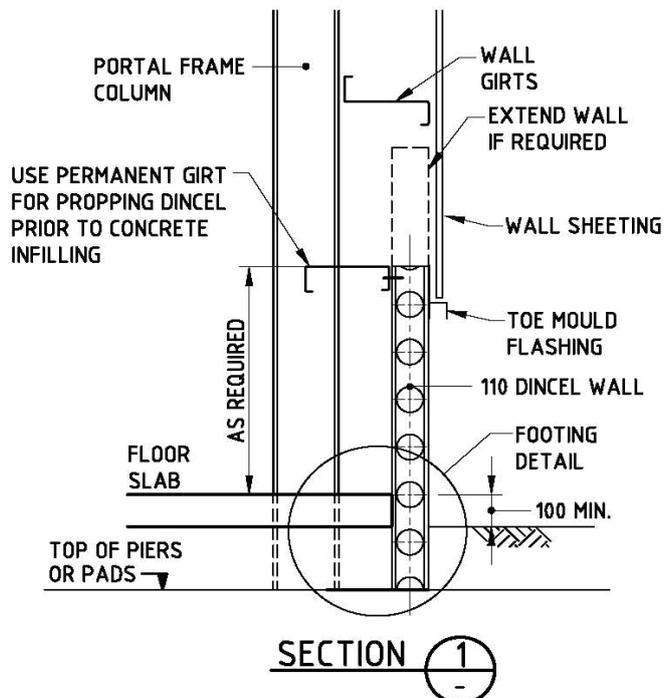
- 1) PLACE PILES/PADS FOR PORTAL FRAMES
- 2) PLACE PORTAL FRAMES
- 3) PLACE PURLINS, WALL GIRTS AND BRACING
- 4) PLACE DINCEL DADO WALL SIMULTANEOUSLY WITH ROOF SHEETING
- 5) POUR SLAB PRIOR OR AFTER THE INSTALLATION OF DINCEL WALL TO SUIT FOOTING DETAILS
- 6) PLACE WALL SHEETING



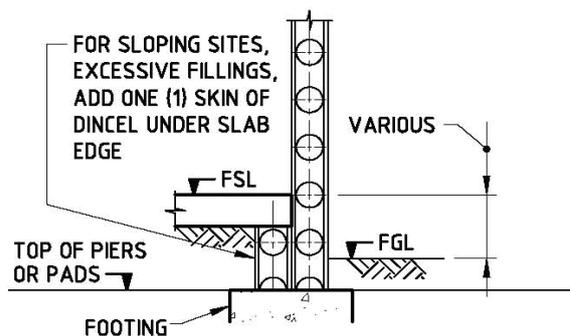
SECTION 2



ALTERNATE FOOTING DETAIL



SECTION 1



ALTERNATE FOOTING DETAIL