

Manufacturing Cost of Pre-stressed, Precast Concrete Hollow Core Load Bearing Planks

Load Bearing Slabs / Planks for Affordable Housing & Residential / Commercial Construction Projects

By Precast Extrusion Plant, Mixer, Batching & Dosing & Concrete Transport System (Mobile Plant)

Total Minimum investments in Plant & Machinery is Rs. 1.23 Cr & subsequently upgrade to highest capacity with investment of maximum 3 Cr. Land required about 2 to 3 – Acre (Rented or Owned extra investment), having length to width ratio of 3:1. Power 125 Kw. List of Imported Machinery (1). **Extrusion M/c** for Load bearing Hollow core slabs for Ceiling, Roofs for Affordable housing, Residential & Commercial project -average 7 Sizes. **Supporting machinery**:- (2). Complete Batching plant 35 CBM Automatic Computer control with suitable 3 bin Batching & Dosing – 1 set (3). Heavy-duty Stressing m/c – 1 set. (4). Universal Mini Dumper for Transport of concrete mix – 2 Nos. (5). Slab Cutting m/c – 1 Nos. (6). Pay-off stand – 3 nos. (7). Gantry Crane 16 Ton with extended arms on both side & Lifting Beam 1 set. (8). Other misc. items like Woolen carpet & Plastic cover for slab, Anchors / wedges Etc. & **Balance Common expenses** for Land Development, Set-up of plant & machinery, making Well-leveled Concrete platform (making similar to good concrete road) for extrusion of slab, 6 Beds open to sky of size 140 meter X 12 meter, Abutment frames, other Civil work etc. Only Extrusion m/c need to be purchased for various size of Slab, rest all other Set-up & Supporting machinery is same. (Total Minimum investments in plant & m/c are Rs. 1.23 (with 120 x 1200 m/c) to 3 Corers (with all extrusion m/c + Common Supporting M/c + Cost of Common Expense).

Please Note :- Also produce other products like concrete Wall panel for Partition Walls, Boundary wall panels, Multi-extruded elements like Supporting 'H' column, Beam, Column, Fencing post, Sq. poles, Lintel, Purlin, 'T' Beam & etc.

Manufacturing Cost for Hollow Core Slabs/ Planks Used for Affordable Housing / Residential & Commercial Projects.							
Particulars of Hollow Core Slabs Size	120mm x 1200	150mm x 1200	180mm x 1200	200mm x 1200	250 mm x 1200	300 mm x 1200	380 mm x 1200
Hollow core Slab Used for Affordable housing / Residential or Commercial project.	Resi.	Resi.	Resi.	Resi/Cml	CommI	CommI	CommI
A). Prices of Extrusion M/c landed at Mumbai port after paying Import duty. Approx. Rs. in Lakhs	11.25	17.70	20.00	27.50	35.00	37.50	44.00
B). Cost of Common Supporting M/c as stated above irrespective of size Approx. Rs. in Lakhs	82.30	82.30	82.30	82.30	82.30	82.30	82.30
C). Cost of Common Expense on Plant Set-up irrespective of size Approx. Rs. in Lakhs	30	30	30	30	30	30	30
Total Investment: With only 1 Extrusion M/c + Supporting M/c + Common Exps. (Total A + B + C) other than in land Rs. in Lacs.	123	130	132	140	147	150	156
Production / day on 3 beds in Sq. Mtr. & for 300 working days is 1,03,500 Sq. mtr for more detail see below.	345	345	345	345	345	345	345
Span (max). of Hollow core slab in meters for slab width & thickness & No. of steel strand wire & it's dia as given in Table	6	7.5	6	7.5	10.5	10.5	12
Load carrying capacity: for above slab width & given Thickness as per Table in Kn / Sq. mtr	8.27	6.19	12.83	8.11	5.76	6.6	5.91
No. of Steel Strands: for above span & load carrying capacity for slab	13	12	8	8	10	10	10
Steel Strands Dia.: in mm used for above slab	7Ø	7Ø	12.7Ø	12.7Ø	12.7Ø	12.7Ø	12.7Ø
Approx. Weight of Slab: having width & thickness as per table In Kgs / Sq. Meter (Indicative)	225	240	270	300	315	380	480
Cost of Concrete Used for Slab is M-50: Cost per CBM of concrete is Rs.3,680/- (Break up of M-50 =18% Cement @ Rs.5,500 / Ton, 30 % sand conforming to Zone 2 @ Rs. 950 / ton, 31% Aggregate 20mm @ Rs. 700 / Ton & 21% Aggregate 10 mm @ Rs. 700 / Ton. Weight of slab Width & Thickness of slab as per table	360	379	426	473	496	598	755
Cost of Steel Strands Used for Slab: for Span & Load carrying capacity as per table	147	281	403	403	504	504	504
Cost of land on Rent i.e. 2 Acre @ Rs.60,000 / Acre / Month. So 60,000 X 2 / 8900 production per month Rs. 14 per Sq. Mtr	14	14	14	14	14	14	14
Cost of Power: (125 KW) for Individual Extrusion M/c & common Batching Plant. Extrusion time for 3 lane is about 6 hrs., so It consumes Power for (10 + 10) 20 day in a month, on this add 30% extra for other operation like Cutting, Lifting, Cleaning & using Crane etc. Total power consumed for production of 8,900 Sq. meter per month will be	10	11	11	11	13	15	15
Cost of Labor: Total 9 Nos. Extrusion M/c Operator – 1 + 2 helper, Batch. Plant Operator – 1 + 1 helper, 1 Wheel Loader operator, 2 Dumper operators & 1 crane operator. Considering Average Salary of Rs. 14,000 / Month all-inclusive. 14000 X 9 / 8900 the cost of labor is Rs. 14 per Sq. Mtr. Extra labor considered for higher Thickness of slab.	14	14	14	14	15	15	15
Cost for Slab Cutting: Assuming average length of plank as per span given above, so total cut per lane will vary from 15 - 22Nos. The cost of blade is Rs 25,000/- & life of Blade is for 110 - 150 cuts. Then cost of wear & tear of blade per cut is considered & cost of 2 labor per day for cutting = Cutting cost per Sq. Mtr.	29	30	31	32	34	36	38
Cost of Repair & Maintenance: i.e. Replacement for Wear & Tear of parts + We assume 10% of cost of m/c is cost towards Wear & Tear of parts. So if we have invested 1.00 Cr. divided by 1,03,500 Sq. mtr production / year then cost per Sq. mtr	9	10	11	12	12.5	13	13.52
Cost for Handling + Storage: with 2 labors & Misc. Expenses etc.	4	4	4	4	5	5	5
Cost of Rejection: (Approx. 2%)Rejection of Finish goods, Wastages & Contingencies & etc.	11	14	17	18	21	23	26
Interest Carrying Cost: on Total Investment @ 18% Per annum, so on 1.03,500 sq. mtr the cost will be	21	22	22	23	25	25	26
Cost for Plant Amortizing & Depreciation: on plant & machinery for 5 years. So on 1.03,500 sq. mtr the cost	18	19	19	21	22	23	24
Production per Year is 1,03,500 Sq. meter with 6 lane casting bed.	651	812	991	1041	1178	1288	1453
Production per Year is 11,13,660 Sq. feet with 6 lane casting bed.	61	75	92	97	109	120	135

Assumptions, Consideration & Conclusion for above Manufacturing Cost Analysis: -

1). Production Cycle for extrusion of slab: - 1st day of month produce slabs on Lane no 1st, 2nd & 3rd and on 2nd day allow for curing & on 3rd day after sufficient curing Cut, Lift & Clean and start casting on same lane from 4th day of month. Go on repeating this. Now on Lane no 4th, 5th & 6th produce slab on 2nd day of month and on subsequent day allow for curing. Now on 4th day after of the month after sufficient curing Cut, Lift & Clean and start casting on same lane on 5th day of month. Go on repeating this. In a month you produce 10 days on 1st, 2nd & 3rd lanes & 10 days on 4th, 5th & 6th lanes. (Production time consumed for 130-mtr long slabs is less than 2 hour & slab cutting about 5 minutes per cut.) Total production per month on 130 meter long casting bed x 95% (efficiency) = output will be 124 running meters x 3lane x 10days + 3 lane x 10 days = 7440 Running meter x 1.2 meter width of slab = 8900 Sq. mtr. Average Production per day is 345 Sq. mtr.

Production per Year is 345 x 300 days working per year = 1,03,500 Sq. mtr with 6 lane casting bed.

2). Zero Slump Dry Concrete having Water Cement Ratio of 0.3%, is required continuously In order to produce Good quality of Planks, we suggest **Automatic Computer control** Batching plant having Dual Cylindrical Mixer with 3 Bin Batching & Dosing with Moisture probes, Hopper for Additive agent + Metering pump for Cement + Additive + Water, 2 Silos having Cement conveying screws & Control cabinet etc.

3). Plant set-up - In a 4 – 6 weeks. Open to sky. Slabs Extruded are Naturally Cured under our hot & humid climate. Being concrete bed, it can be set-up on the main road of Project site there by, Reduce hassle & Cost of Transport of precast element + Save on Taxes & Govt. duties. One can call this plant is as good as Mobile plant.

4). Start with lowest investment initially, than upgrade the plant to highest capacity.

5). Investment payback: for example Approx. minimum Market price for extruded slab of 200mm x 1200 mm is around Rs. 1,300 Sq. mtr less cost as above is Rs. 1,040 Sq. mtr, hence Profit is say Rs. 260 per Sq. mtr. Investment payback is by Use / Sale of 6 months production of slab i.e. 51,000 m² (5,48,000 ft²). (Investment return varies with products & volumes).

6). Precast plant Comparison: **European plant V/S. Chinese Plant (Jugaad Plant)** as follow Etc.:-

A). Investment is 5 times higher than Chinese Plant.

B). Manufacturing Cost is 1.35 times higher than Chinese Plant.

C). Return on Investment will be 36 / 40 months & Chinese Plant will be within 6 to 8 Months.

D). Interest Carrying Cost is 4 times higher than Chinese Plant.

E). Cost for Plant Amortizing & Depreciation is 4 times higher than Chinese Plant

For More detail refer our web site & (Back page) Comparison: - Why Chinese Plant (Jugaad Plant) & Machinery is most economical & Simple Smart Solution compared to any European or American Plant & Machinery.

Precast, Pre-stressed Concrete Hollow Core Load Bearing Slabs / Planks

Comparison: - Why Chinese Plant & Machinery (Jugaad Plant) is most Economical & Simple Smart Solution Compared to any European or American Plant & Machinery

	Description	European Machinerics	India Precast Machinerics
1	Plant Installation	In Heavy Industrial shed with minimum 2 cranes	Open to sky. With 1 crane only.
2	Area required to set-up plant etc.	4 / 6 Acres. Storage of slab is done outside the Shed. Additional crane required in the yard.	2 / 3 Acres. Storage of slab is done adjacent to Extrusion bed with same crane having extended arms
3	Extrusion of slab	On Very expensive Steel casting Bed.	On Smooth & well-leveled Concrete platform / floor
4	Bed Length & No. of beds	Bed Length: 130 meters No of Casting Beds: 5	Bed Length: 130 meters. No of Casting Beds: 3 + 3
	Out of 300 working days in a year how many days Extrusion of Hollow core slabs is done? Average production / Year	Extrusion is done on all 5 beds for 300 working days in a year. Production can be daily as steam is passed Underneath steel beds through Boiler for steam Curing. Which is Very costly & consumes high power too. Total production / year is 1,33,000 in Sq. mtr.	Extrusion is done on 3 beds for 240 working days in a year. 1 st day Extrusion is done on 3 beds & 2 nd day allow for Natural curing & 3 rd day for Cutting, Lifting & Cleaning. Balance 3 beds extrusion is done on subsequent day & repeats as above. Total production / year is 1,03,500 in Sq. mtr.
5	Investment in Precast Extrusion M/c having width of 1200 mm + Supporting m/c + Common expense for Set-up Plant for Residential project & Commercial Projects	Cost of 6 (3+3) Extrusion M/c having thickness of 1). 120, 150 & 200 for Residential is of Rs 3 Cr (3 M/c) 2). 250, 300, 380 for Commercial is of Rs 4 Cr (3 M/c) Plus Rs. 8 to 15 Cr for steel Casting beds, Concrete Batching Plant, Cranes, Supporting M/cs. etc.	Cost of 6 (3+3) Extrusion M/c having thickness of 1). 120, 150, 200 for Residential is of just Rs 57 lac (3 M/c) 2). 250, 300 380 for Commercial is of Rs 1.16 Cr (3 M/c) Plus Rs. 1 to 1.5 Cr for Concrete Casting beds, 35 CBM Concrete Batching Plant, Cranes, Supporting M/cs, etc.
6	Import duty Value & spares	High on import value, So High on spares	Low on import value there by Low on spares
7	Requirement Power & Consumption	750 KW. Consumption is Very high as there are lot of high rated capacity machines + 3 Cranes + Steam Boiler for curing + Shed illumination.	125 KW. Consumption is Low. Simple m/c. Only 1 Crane + Open to sky hence Natural curing, No Boiler + No illumination required.
8	Type & Design of Extrusion M/c.	Modular Design. Highly Computerized & Automated. Made to counter their climate & to offset the cost of highly paid manpower.	One size One Machine. Simple Start & Stop Functionality. Needs basic Technical Manpower to operate & maintain.
9	Hopper's Capacity & Height & Concrete Mix Delivery system	1.5 CBM. Height of Hopper is Very high, Costly to feed Concrete Mix by Shuttle system + Overhead cranes or With Overhead Crane & Skip Bucket.	1 CBM. Height of hopper is Very Low, Easy to feed Concrete Mix By Mini Dumpers which are also cheap & Used for Pulling steel strand + other construction activity.
10	Concrete Mix Delivery Time & Cost of Maintenance + Power.	Very High + Very Costly & High on Maintenance & Power consumption.	Very fast + Cheap. Low on Maintenance & No power is consumed. It operates on Diesel.
11	Concrete Batching plant	Hi-fi Batching plant (Very costly). Installed at the height of 30 feet so that concrete can be deliver by shuttle system & overhead crane. Difficult to clean. Concrete Mix Result good	Simple Batching plant & Specific to its Requirement. Installed at 8 feet height & discharge concrete mix straight into Mini Dumper & Easy to clean. Concrete Mix Result is same as same Raw material is used
12	Cost of Curing of Concrete slab	Very high as done by Steam Curing	Very Low as Natural curing in Hot & Humid Climate.
13	Investment	6 times higher than Chinese Plant.	Only 1.23 Cr to 3 Cr. Because of Jugaad plant
14	Manufacturing Cost	1.35 times higher than Chinese Plant	Natural curing + investment is low etc.
15	Return on Investment	36 / 40 months	6 to 8 Months
16	Interest Carrying Cost	4 times higher than Chinese Plant	Because of Low on Investment
17	Cost Amortizing & Depreciation	4 times higher than Chinese Plant	Because of Low on Investment
18	Time to set up Plant	36 weeks for steel beds & Shed Required	6 weeks Concrete beds & no shed.
19	Flexibility of shifting plant	Very difficult in case of Labor Unrest	Very simple & Easy. It is as good as Mobile plant & can be installed at project site.
20	Price of Extrusion M/c	4 to 5 times higher than Chinese Plant.	Simple Start stop m/c No computer controls.
21	Cost of Common Supporting M/c	5 times higher than Chinese Plant	Economical design & low profit margin
22	Price of Batching Plant	4 times higher than Chinese Plant	Simple Batching plant & Specific to its Requirement
23	Production of Hollow core Slab	1.2 times higher than Chinese Plant	Natural curing Takes time Hence less production.
24	Maintenance Cost	3 times higher than Chinese Plant	Simple design, easy to maintain with local parts
25	Labor requirement	2 times higher than Chinese Plant	No highly skilled labor is required.
26	Slab Cutting Cost	3 times higher than Chinese Plant	Simple design, easy to maintain with local parts
27	Handling & Storage Cost	2 times higher than Chinese Plant	Crane design has extended arms to store slab next to casting bed.