Robin Village Development Pte Ltd (RVD) is a subsidiary of Tiong Seng Holdings Limited. RVD is a precaster specialising in fabrication of concrete components from design development, production to installation in Singapore.
Our iconic projects
Gardens By The Bay

Core wall, staircase flight, external curve wall, fin

Height of Tower = 50.0m
Internal Core = 4.0m φ
External Core = 7.3m φ
Parkroyal on Pickering

Planter box, GFRC feature wall, cobiax slab
CapitaGreen

External wall cladding, column, beam, beam with ledge, planter, wall panel with terracotta tiles, bench
HDB Public Housing at Punggol

External façade with sunshade, internal façade, column, beam, balcony, staircase wall, lift wall, staircase flight, household shelter, non-prestressed and prestressed planks, refuse chute, aircon ledge

Balcony

External façade with sunshade
Tembusu

Fin Wall, trellis, slab, terrace

Precast Terrace

Precast Terrace
Prefabrication Bathroom Unit (PBU)
Prefabrication Bathroom Unit (PBU)
Singapore is a small, heavily urbanised island city in South East Asia with a total land area of 719.1 square kilometres.

The Singapore area comprises mainland and other islands. The mainland measures 50 kilometres from east to west and 27 kilometres from north to south.
Singapore’s population in 2017 stand at 5,612,253 million out of which only 3,439,177 are Singapore citizen.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>5,612,253</td>
</tr>
<tr>
<td>Resident Population</td>
<td>3,965,796</td>
</tr>
<tr>
<td>Singapore Citizen Population</td>
<td>3,439,177</td>
</tr>
<tr>
<td>Permanent Resident Population</td>
<td>526,619</td>
</tr>
<tr>
<td>Non-resident Population</td>
<td>1,646,457</td>
</tr>
</tbody>
</table>
News Article on Construction Contracts Expected in 2017

Some S$28–35b of construction contracts expected in 2017: BCA

The Building and Construction Authority (BCA) on Friday forecast that the total value of construction contracts to be awarded this year will reach between S$28 billion and S$35 billion, higher than the preliminary estimate of S$26.1 billion for last year. ST PHOTO

The Building and Construction Authority (BCA) on Friday forecast that the total value of construction contracts to be awarded this year will reach between S$28 billion and S$35 billion, higher than the preliminary estimate of S$26.1 billion for last year.
The budget for construction in Singapore has been more than $26 billion Singapore dollars for the last few years.

In year 2015 the budget was $27 billion, in 2016 was $26.1 billion and in 2017 estimated $35 billion Singapore dollars.

With such a large construction budget and a small population of 3.4 million Singaporean, the construction industry require a large number of foreign manpower to supplement our construction work force in order to carry out the construction projects.

### Foreign workforce numbers

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Employment Pass (EP)</td>
<td>173,800</td>
<td>175,100</td>
<td>178,900</td>
<td>187,900</td>
<td>192,300</td>
</tr>
<tr>
<td>S Pass</td>
<td>142,400</td>
<td>160,900</td>
<td>170,100</td>
<td>178,600</td>
<td>179,700</td>
</tr>
<tr>
<td>Work Permit (Total)</td>
<td>942,800</td>
<td>974,400</td>
<td>991,300</td>
<td>997,100</td>
<td>992,700</td>
</tr>
<tr>
<td>Work Permit (FDW)</td>
<td>209,600</td>
<td>214,500</td>
<td>222,500</td>
<td>231,500</td>
<td>239,700</td>
</tr>
<tr>
<td>Work Permit (Construction)</td>
<td>293,300</td>
<td>318,900</td>
<td>322,700</td>
<td>326,000</td>
<td>315,500</td>
</tr>
<tr>
<td>Other Work Passes²</td>
<td>9,300</td>
<td>11,300</td>
<td>15,400</td>
<td>23,600</td>
<td>28,300</td>
</tr>
<tr>
<td>Total Foreign Workforce</td>
<td>1,268,300</td>
<td>1,321,600</td>
<td>1,355,700</td>
<td>1,387,300</td>
<td>1,393,000</td>
</tr>
</tbody>
</table>
For many years, Singapore Government has emphasized on productivity, value-adding, and being less reliance on foreign manpower.

After years of surging foreign manpower growth, the Government moved to tighten the tap in a bid to shift away from low-skilled labour. Work permit levies were raised, while the criteria for S-Passes and Employment Passes were tightened. Core Trades are created to upgrade workers’ skill

Currently the work permit levy for non-skilled construction foreign worker is $950 per month.
Challenges of Singapore Precaster :-

1) Land Constraints
   - Land for production of precast

2) Manpower Constraint
   - Shortage on foreign manpower to carry out the construction

3) Government Agencies requirements:-
   - Dust level - PM 2.5 micro
   - Noise level
     - 7am – 7pm (75dBA),
     - 7pm – 11pm (70dBA)
     - 11pm – 7am (65dBA)
   - Working Hours
     - 44 hours week
     - Not more than 72 hours overtime per month

4) Profit
From 2008 to 2010 with a land size of only 1.4ha, RVD, like most of the precasters in Singapore were casting in the open.

**Open, Noisy, Dusty**  
Low-Density : GPR < 0.1  
Labour intensive : 150 workers  
Production Capacity : 43,000m³  
Land Productivity : 1 Casting Round

**Enclosed, Quiet, Clean**  
Multi-Storey : GPR 1.4  
Highly-mechanized : 50-70 workers  
Production Capacity : 100,000m³  
Land Productivity : 2 Casting Round
In 2010, Tiong Seng Holdings decided to build a factory to house the precast manufacturing business. With all the challenges in mind and in line with Singapore Government objectives, RVD came up with a factory plan. The proposed factory consist of 5 storeys office space and 3 storeys production area and a dormitory area.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Site area</strong></td>
<td>13,970.70 m²</td>
</tr>
<tr>
<td><strong>GFA</strong></td>
<td>19,606.27 m²</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>63 Tuas Avenue 1</td>
</tr>
<tr>
<td><strong>Comprises</strong></td>
<td></td>
</tr>
<tr>
<td>5 storeys ancillary office space</td>
<td>4697.36 m²</td>
</tr>
<tr>
<td>3 storeys production area</td>
<td>14,067.15 m²</td>
</tr>
<tr>
<td>Worker’s dormitory</td>
<td>841.76 m²</td>
</tr>
</tbody>
</table>

72% of the GFA is allocated for production purposes
In year 2012, we built the first “Integrated Construction and Prefab Hub” (ICPH) in Singapore, designed to boost productivity and create an environment for green and gracious living. The Hub comprises of ancillary offices and production area for automated precast production, formwork services & assembly area, approved training & testing centre, workers’ dormitory and roof top garden.
Singapore's first Integrated Construction & Prefab Hub was opened in 16 May 2012 by Mr. Tharman Shanmugaratnam (Deputy Prime Minister & Manpower Minister) Cost : S$36m
More about our ICPH

✓ **Batching Plant**

Starting from the batching plant. All our raw materials are stored in fully covered storage compartment as compared with most of the batching plants in Singapore which are stored in the open. The land required is minimised.

<table>
<thead>
<tr>
<th>Cement and Aggregate Silo</th>
<th>VS</th>
<th>Cement and Aggregate Silo Operated by Computer System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batching Plant</td>
<td></td>
<td>Aggregate (20mm &amp; sand)</td>
</tr>
<tr>
<td>Storage for Sand</td>
<td></td>
<td>Cement</td>
</tr>
</tbody>
</table>
✓ Vertical Curing Chambers

Convention method is to cast the panel and leave it to cure for 14 to 16 hours. In RVD, we have multiple level vertical curing chambers to store our cast concrete. Having vertical chambers reduces the horizontal foot print and optimises land use.

The cast concrete together with the mould are transferred and stored in the space-saving curing chamber and cured under ideal ambient condition of 50°C.

This curing chamber is equipped with steam curing facilities which allows us to demould the panel within 5 to 6 hours after casting. This allow us to maximise productivity against land used.

![Convention Curing vs Steam Curing](image-url)
✓ PBU fabrication

✓ Mould fabrication
Advanced Formwork and Safety Training Programme

incorporated in ICPH to bring together the services provided by Tiong Seng

Tiong Seng Training Centre is accredited by Singapore’s Building & Construction Authority (BCA) to conduct Advanced Formwork Training for tradesmen and Foreman.

The Centre also conducts safety courses like Work at Height training for Supervisors and Workers.
Formwork Services & Assembly Area

Storage and services are all brought into one location.
✓ Ancillary Offices located at all levels. RVD is on level 5
Worker’s dormitory located at the roof top with enhanced natural ventilation

This allow RVD to:

- Save on transportation
- Better control of our workers in the factory
- Provide better welfare and living environment for the workers
 ✓ **Roof Top Garden**

located at the roof top to encourage green and gracious living to enhance the living and working environment for staff and workers.

 ✓ **Green roof**

with insulation properties and greenery to reduce heat to rooms at roof top.
✓ Rain Water Tanks

located at roof top for rain water harvesting for irrigation to reduce usage of potable water

ICPH is designed to be highly energy efficient with environmental sustainability in mind.
Shortage of Manpower

RVD had incorporated an automated precast plant which enable us to save on manpower. Below are some areas of manpower saving achieved.

✓ Side Forms

Side forms are secured by magnets instead of bolts and nuts. This effectively reduce the time needed to assemble and dismantle the mould without damage to the mould base.

Bolts & Welding VS Magnets

Bolts and Nuts Magneto Clamps
Concrete Truck vs Flying Bucket

Concrete are transported by “Flying Bucket” instead of “Concrete Truck”, this result in manpower saving.
Hydraulic concrete distributor vs Convention distributing of concrete – cont’d
Hydraulic concrete distributor vs Convention distributing of concrete

Concrete is poured into the mould using the automated “Concrete Distributer” and compacted by vibrating table. The whole process only required 1 worker to operate the automated “Concrete Distributer”. This result in manpower saving.

<table>
<thead>
<tr>
<th>Job Description</th>
<th>Manpower Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate Crane</td>
<td>1 man</td>
</tr>
<tr>
<td>Holding of concrete bucket</td>
<td>1 man</td>
</tr>
<tr>
<td>Opening of Concrete bucket</td>
<td>1 man</td>
</tr>
<tr>
<td>Vibration of Concrete</td>
<td>1 to 2 men</td>
</tr>
<tr>
<td>Levelling of Concrete</td>
<td>2 men</td>
</tr>
<tr>
<td><strong>Total Number of Manpower Required (Approximately)</strong></td>
<td>7 men</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job Description</th>
<th>Manpower Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operate Hydraulic Concrete Distributer</td>
<td>1 man</td>
</tr>
</tbody>
</table>

Saving of manpower achieved
Video of our ICPH
THANK YOU
&
Merry Christmas