Rotary Bored Piles can be used to support any structure where the highest load carrying capacity is required. Balfour Beatty Ground Engineering has developed specialist expertise to deliver large, complex and technically challenging projects.

**BASIC TECHNIQUE**

Drilling tools, including augers and buckets, are used to excavate the soils to form an open hole to the required depth. Where unstable ground conditions are present, commonly within made ground and in granular layers, a steel casing is used to provide temporary support. This casing is either screwed in using the rig or vibrated into place. A reinforcing cage is then installed into the open bore and concrete is poured via a delivery tube or tremmie pipe. If a steel casing was used it is later withdrawn.

**STRENGTHS**

- Minimal ground disturbance - with limited risk of damage to adjacent structures
- Suitable for all soil types
- Simple and efficient installation process
- Ability to drill through most obstructions and socket into rock
- Ideal for insitu cast retaining walls where high levels of reinforcement and tight drilling tolerances are needed

**ROTARY BORED PILE CONSTRUCTION SEQUENCE**

1. **Auger excavates the hole**
2. **Steel casing is installed**
3. **At the design depth, a clearing bucket ensures the base of the pile is sound**
4. **After insertion of reinforcement concrete is trembled in from the base**
5. **Steel casing is removed leaving completed pile**
**TECHNIQUE ENHANCEMENTS**

**Use of Oscillator**
Where minimum disturbance is critical (e.g. close to an existing building or railway line), an oscillator can be used to install the steel casing with great precision.

**Hollow Piles**
BBGE have developed piles with a hollow core, saving concrete and steel with no loss in performance, in collaboration with City University.

**Under-reams**
In stable soils the base of the pile can be extended up to a 6.3m diameter to form an inverted cone, which delivers a very high load-bearing capacity. This allows piles to be founded at a shallower depth, potentially avoiding lower unstable soils.

**Plunge Columns**
Standard H section beams, as well as fabricated steel box or H sections, can be plunged into the pile following concrete placement. These columns are commonly used for top-down construction, which enables simultaneous superstructure construction and basement excavation, or where temporary propping or support is required to adjacent structures. This technique can significantly reduce the overall build cycle.

**Drilling Fluids**
Where unstable ground exists at depth, and it becomes uneconomical or impractical to use casing, a vinyl polymer or bentonite drilling fluid can be introduced to support the bore during excavation. When the concrete is being tremmied into the bore, the polymer or bentonite fluid is displaced and pumped out before being cleaned and recycled for use in the next pile.

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**TECHNICAL CAPABILITIES – ROTARY BORED PILES**

<table>
<thead>
<tr>
<th>Specification</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical Depth</td>
<td>N/A</td>
<td>70m</td>
</tr>
<tr>
<td>Diameter</td>
<td>0.45m</td>
<td>3.0m</td>
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<tr>
<td>Typical Load Capacity</td>
<td>1000kN</td>
<td>30,000kN</td>
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<tr>
<td>Rig Height</td>
<td>12.5m</td>
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<tr>
<td>Rig Weight</td>
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<td>Rig Length</td>
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<tr>
<td>Rid Width</td>
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<td>5m</td>
</tr>
<tr>
<td>Noise Profile at 10m</td>
<td>85db</td>
<td>90db</td>
</tr>
</tbody>
</table>

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