

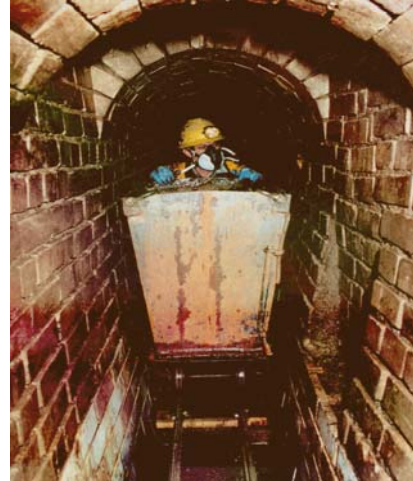
# Hard Rock Tunnelling

Carnon Contracting was originally formed in 1988 to market the mining expertise of Carnon Consolidated, which at that time owned and operated the South Crofty and Wheal Jane hard rock tin mines.

The majority of the many thousands of metres of tunnelling carried out in the above mines was either in competent granite or 'killas' (shale) which required no support, other than the odd 'spot' rock bolt, but in some instances there were areas of weak ground where steel arch supports or a systematic installation of either rock bolts or split sets (sometimes combined with either steel reinforcing mesh or shotcrete or a combination of both) were installed and in the high wall stopes the sides were supported using cable bolts.

- Health and Safety trained operatives and management
- Confined spaces trained site and management team
- CSCS scheme in operation for site and supervision staff

Using all of the skills gained in the above mines, Carnon Contracting have carried out various projects from long tunnels using trackless mining equipment to short road crossing tunnels with steel arch supports, excavated by hand.



*Working in Yellow Sands outfall tunnel*

Examples of the work carried out are detailed below :-

- The excavation of a 877 metre tunnel, 2.8m high x 2.3m wide, using trackless mining equipment, for South West Water (SWW) in Somerset as part of the Wimbleball Reservoir drought alleviation scheme.
- The clearance of debris and refurbishment where required, of the 520m long SWW Yellow Sands outfall tunnel at Newquay, Cornwall using a custom made tracked haulage scheme.
- The clearance and refurbishment of the 146m long connecting adit between Roskear Shaft, Camborne and the Deep Adit mine water drainage system, for the EA.
- Road crossing tunnels for Alfred McAlpine
- Tunnel refurbishment in Bathstone quarries for Hanson Plc.
- The construction of a 35m long pipe outfall tunnel through varied geological ground at Coombe Martin and two 10m pipe service tunnels in Exmouth, all for Birse Construction as part of their contract for SWW.
- The clearance and refurbishment where required of the 20m long Tottiford Dam drainage tunnel for SWW.



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# Shaft Sinking and Tank Construction

Carnon Contracting are experienced in the construction of lined and unlined tanks and shafts. Projects that have been completed range from 2 metre diameter shallow shafts to 12.5 metre diameter segmentally lined tanks for the waste water industry.

The specific method of shaft construction depends on the ground conditions expected to be encountered on-site.

- Health and Safety trained operatives and management
- Confined spaces trained site and management team
- CSCS scheme in operation for site and supervision staff

If access is a problem and ground conditions allow, the top down 'underpinning' method of construction may be used. This allows for shafts of considerable size and depth to be constructed without the need for expensive sheet piling or other methods of excavation support. When this is not possible, it is usual to form a supported excavation, install a concrete base and build the shaft using reinforced concrete ring segments from the bottom-up.



*Segmental shaft sinking at Reskadinnick, Camborne, Cornwall*

If the shaft is to be used as a permanent or semi permanent structure it can then be lined as required with concrete as segments or cast in situ. Carnon Contracting have also in the past constructed shafts by 'raising' from beneath instead of sinking from surface. This can have the advantage of needing a much smaller footprint on surface than traditional shaft/tank sinking.

Clients that we have provided shaft and tank solutions for include:-

- Alfred McAlpines - Reskadinnack, 12.5m diameter, 7 metres deep.
- TJ Brent - Lulworth Cove, 7m diameter, 15 metres deep
- South West Water - St Michaels Mount, 2m diameter, 10 metres deep tidal.
- Alfred McAlpines - Flushing, 5 metres diameter, 8 metres deep.
- South West Water - Porthpean, 4 metres diameter, 5 metres deep.
- Irish Salt - Ireland, 4 metres diameter, 150 metres deep shaft enlargement project.
- Crew Holdings - Roskear Shaft, 5 metres diameter, 611 metres deep, refurbishment.
- Trafalgar House Construction - 25 metre deep, 5 metre diameter shaft 'raised' up to surface next to a busy road.



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