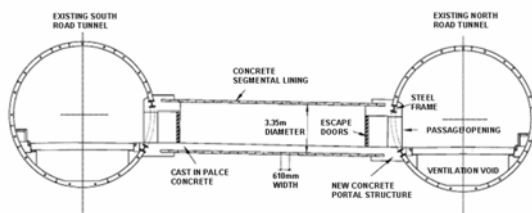


Brokk overcomes access problems in the Mersey tunnel, UK

The need to modernise and increase the safety of older tunnels raises challenges in maintaining the operation of the tunnel during the improvement works. The Mersey Kingsway twin road tunnels, located in Liverpool were constructed in the late 1960s. Following fatal incidents in other road tunnels in Europe, the Mersey Tunnels needed to be upgraded for increased safety. The upgrade included the construction of three new cross passages to allow emergency evacuation from one tunnel to the other, and provide safer access for emergency services.



The main tunnel contractor, Amco Donelon, faced a number of access problems and practical difficulties. Excavation of the cross passages could only be done during night when one of the main tunnel bores could be closed. At the end of each night, all equipment and materials had to be removed, to allow the tunnel to reopen for the start of the following morning's 6.30 am rush hour. Also, working conditions were cramped and ventilation in the confined working area was limited. Finally, the method of excavation had to consider the Health & Safety guidelines to prevent Hand Arm Vibration Syndrome ("whitefinger").

Amco Donelon contracted by Gnat International, with a fleet of Brokk machines to do the job. The versatility of the small, triple boom, electro-hydraulic Brokk machines allowed Gnat not only to operate in the limited headroom of the 3.35 meter diameter passages, but also to use con-

ventional hydraulic hammers to break the bunter sandstone rock.



"A conventional large roadheader would have proved impractical for such short 17 meter drives but the Brokk machines, with their excellent size to power ratio, could remain in the crossover tunnels during the day," said Amco Donelon site manager Jim Yerkess.

Gnat achieved drive rates of up to 2 meter in a 12 hour shift, equal to 1.5 cubic meters per hour. The electro-hydraulic drive avoided problems with ventilation in the confined working area. With the help of the versatile Brokk machines, Gnat UK was able to complete the project safely, quickly and within budget.

"Our machines only weigh 3.5 tons but have the power of an excavator four times heavier" said Nick Turnbull, director of specialist demolition contractor Gnat International. "Their articulated booms can operate horizontally and, like a human arm, push forward into the face".

