Channel Tunnel Fire Fighting System Trouble Shooting and Commissioning

System : Tunnel Fire Fighting
Location : English Channel
Scope : Site Trouble Shooting
Client : TML
Study Date : 1993
Length : 60 km
Fluid : Firewater
Capacity : 120 m³/hr at 7 bar

Study Scope

The Channel Tunnel is the longest undersea tunnel in the world. The section under the sea is 38km long and consists of three parallel tunnels – two 7.6m diameter rail tunnels and a third smaller 4.8m diameter service tunnel. The three tunnels, each 50km long, were bored at an average 40m below the sea bed, and link Folkestone in England to Coquelles in France. The fire fighting system provides water as close as possible to any fire in the tunnels via a water main in the service tunnel to a series of hydrants at 125m intervals (each with duel French and UK hose connections). The firewater system includes 4 storage tanks (each 800 m³ capacity at every portal and shaft) with an associated pump house. The network includes 60 km of pipes with diameters varying between 100mm to 250 mm and is able to deliver 120 m³/hr at 7 bar.

Hydraulic Analysis were not involved in the original design of the fire fighting system and there were a number of important issues which were not addressed at the design stage. Following attempts to commission the system, it quickly became evident that there were significant delays following activation of the fire water pumps before the hoses received adequate flow to fight any fires. As a result of this unacceptable delay in receiving water, Hydraulic Analysis were tasked with modifying the design. We attended the site and installed our transient pressure and flow monitoring equipment on a hydrant inside the tunnel and the pumps were started. Our investigations showed that the pumphouse accumulators were delaying the time taken for water to be delivered into the supply lines. Following some further desk based analysis work, we recommended modifications to the connectivity of the accumulators and, once these were implemented, the system behaviour improved significantly and the fire fighting system successfully passed the commissioning tests.