

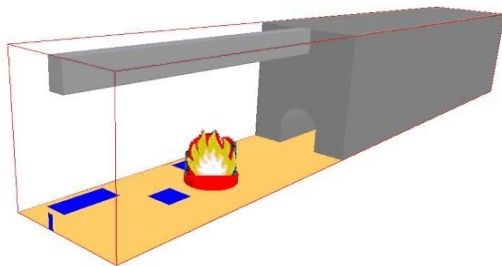


**CHAM Limited**

*Pioneering CFD Software for Education & Industry*

**PHOENICS CASE STUDY**  
**Sprinkler Fire Suppression Study**

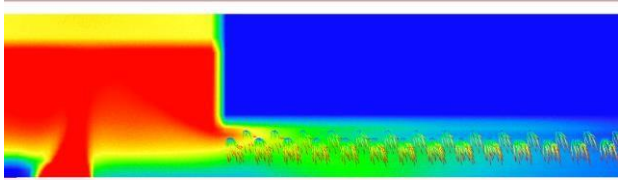
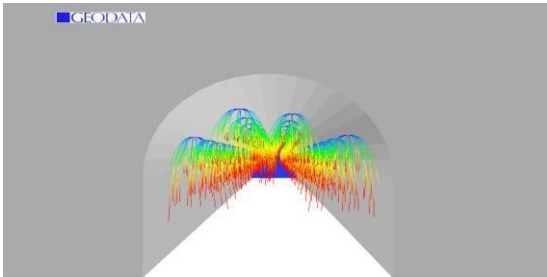
Italian GeoEngineering consultants, GeoData Srl, applied the sprinkler-modelling capabilities of PHOENICS/FLAIR for a multi-storey underground hydraulic power station. In the scenario described below, one of the two generators is on fire (38MW). All the blue areas are treated as entrances for fresh air from other parts of the complex. There is a walking pass cross the ceiling of the chamber for emergency evacuation. (One might imagine that the original design was for flood instead of fire). The focus of the study is on the tunnel at the end of the chamber.



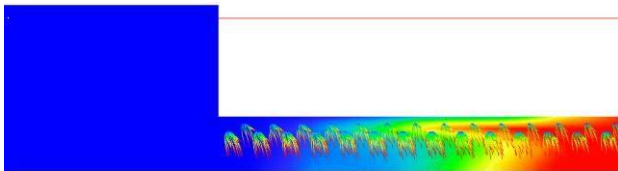
GeoData's client needed to know that the temperature in the tunnel would remain low enough so that the fire brigade could access the complex through the tunnel in which sprinklers are installed for this purpose.

*There are 60 sprinklers installed near the entrance of the tunnel.*

The figure below shows the temperature distribution in the first section of the tunnel. The temperature range in the access tunnel is between 11°C and 140°C (the temperature in the red region is higher than 140°C).



As expected, the water spray has destroyed the smoke stratification before cooling it down. Unlike a normal tunnel fire in which the general public may be involved, the smoke stratification is not particularly important in this case.



The figure (left) shows the distribution of relative humidity from 0 to 100%