



Hong Kong International Airport Investigation of Airport Runways

Description of Work

The new Hong Kong International Airport opened on 8 July 98. Following airport opening the asphalt surfacing at certain locations on the shoulders of the northern runway and taxiways was found to heave during extreme wet weather. The heave took the form of domes with a diameter of 2m to 10 m and a height of 50mm to 500 mm. The domes typically subsided within an hour but the asphalt surfacing was often damaged within the footprint of the dome.

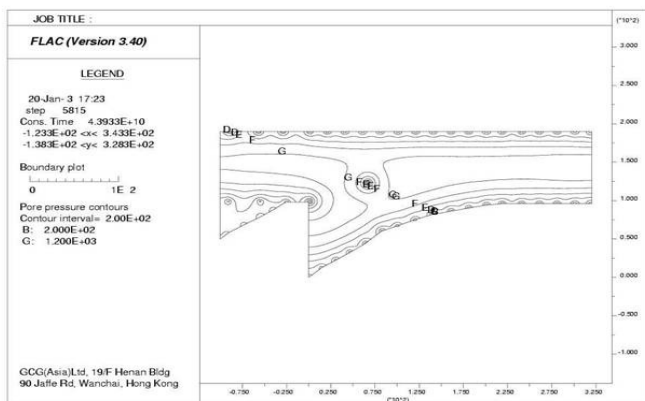
GCG (Asia) Ltd was commissioned by the Airport Authority to identify the source of the heaving problem and to design remedial measures to prevent the heaving. The investigation work included extensive monitoring of the air pressure beneath the asphalt and measurement of the air permeability of the runway pavement materials. The air pressure monitoring equipment and laboratory permeability equipment and test methods were designed by GCG (Asia) Ltd. The investigation work identified that the problem was caused by the rising tidal water level beneath the runway displacing air from the voids in the fill. The reduction in the permeability of the pavement materials during wet weather due to surface tension effects effectively trapped the air, causing heave of the surfacing.

GCG (Asia) Ltd. carried out detailed numerical modelling of the air flow within the reclamation and developed the design for a system of vertical vent pipes adjacent to the runway to assist in dissipating the air pressure build up. The results of the numerical modelling have been calibrated against the pressure monitoring data. The air vents have now been installed and form the permanent solution to the runway/taxiway heaving problem at the Hong Kong International Airport.

Client: Airport Authority

Dates: 1999- 2003

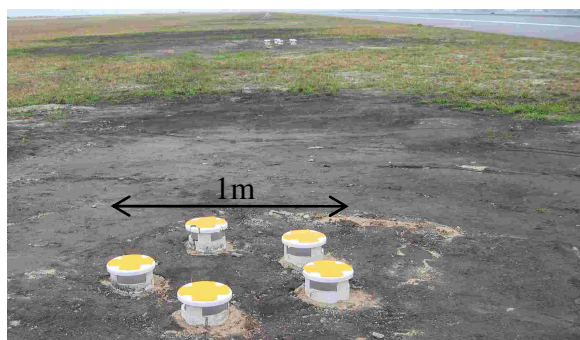
Estimated Project Cost:
HK\$ 50 million



**FLAC modelling of air pressure build-up
on the runway and taxiway**



Asphalt dome on taxiway



Air vent