SUMMARY

Structural concrete defect is a typical phenomenon encountered all over the world, although the structural design may vary to some extent, from one country to another.

The most common structural concrete defects experienced in Singapore includes cracking, which is one of the most fundamental problems, corrosion of reinforcement and subsequent spalling of concrete, leaking, dampness and condensation, and defects caused by marine environment.

Cracking of concrete is largely due to volumetric changes, which in turn are caused by shrinkage, creep, thermal effect and incompatibility of its constituents. Other causes are being the applied load and flexural stresses. Regardless of the causes, effective repair should be carried out if cracking of concrete can not be absolutely prevented.

Corrosion of reinforcement and subsequent spalling has been reported by the majority of the tenants in high-rise residential buildings. Besides the presence of moisture and aggressive agents in atmosphere, lack of adequate concrete cover on the reinforcement is the main contributory cause. Depending on the extent of damage, remedial action will vary
from simply patching up the spalling portion, to strengthening of the structure with additional reinforcement and reinstatement of the whole structure.

Leaking in flat roofs seem to be another common problem experienced in Singapore. Study shows that one of the most significant cause for defective roofs is associated with failure of waterproofing system. Perhaps, the severity of the local weather conditions are overlooked during design stage, and coupled with the poor workmanship, failure rate of membrane is relatively high. More importantly, the leakage and dampness would eventually enhance the rate of deterioration, particularly in relation to the reinforcement corrosion. Taking into account of local environment and selection of the appropriate material and application could prevent the leaking problem effectively. Dampness could be prevented by application of damp proof course correctly.

The very nature of marine environment is the salts content. In order to minimise, if not totally prevent the entrance of salts, quality of concrete and the cover for reinforcement shall be of appropriate grade and adequate depth. Again, the implication due to the presence of chloride ions is mainly concerning the corrosion of reinforcement.
Case studies, forming part of this dissertation, had covered defects such as cracking and leaking, cracking due to uneven settlement, corrosion of reinforcement and spalling, and condensation. Beside the diagnosis for identifying causes, recommended prevention and remedies were included whenever it was appropriate.