SUMMARY

The unprecedented pace at which highrise buildings changed the skyline of Singapore in the 70's and 80's brought with it some problems in maintaining and cleaning the facades of these buildings.

Based on the author's hypothesis that building design has an important influence on subsequent cleaning and maintenance cost of the facade, this study sets out to show with supporting data the influences of design of building facade on maintenance. It also provides feedback of maintenance problems to the architect and suggests methods of ensuring a link between the architect and the maintenance manager to improve the overall efficiency in the building industry.

The issues examined in this study include:

(1) A discussion on the needs of access to external facades of commercial highrise buildings and the problems faced.

(2) Various types of designs and finishes of building facades and their implications on maintenance.

(3) Various types of access systems - the permanent and temporary installations and the robotic system.
(4) Case studies on common design faults.

(5) Analysis of the cleaning cost implication in relation to design consideration for access.

Through case studies and observations during site visits, a few pointers are gathered on design considerations in the choice of the cladding material, its jointing methods and details on its placing. For example, mitre joints for glazed aluminium frames without proper drainage details normally lead to streaks of dirt staining the facade below the aluminium frames.

Data on elevation area (both glazed and tiled surfaces), cleaning cost of the facade and cleaning frequency etc. of 32 buildings are collected, analysed and conclusions drawn as follows:-

(1) Building facades which are cleaned either half-yearly or yearly constitute 57.4%, just over one half of the population.

(2) There is an increasing number of new buildings designed with permanent access for ease of maintenance.
(3) Without taking into account the capital cost of the access equipment, the average unit cost of cleaning the facade of a typical building with permanent access system is lowest at $0.48 per sq metre (psm), compared with $0.86 psm for buildings with temporary access points and $0.93 psm for buildings without provision of any access system.

The respective unit cleaning cost of the 3 groups of buildings are $0.48 psm, $0.70 psm and $0.73 psm when cost of hiring of access equipment is excluded. This shows that buildings with permanent access system are more economical to maintain subject to qualifications as discussed. The images of these buildings are also enhanced as the cleaning and maintenance job could be attended to expeditiously without having to wait for the temporary access system to be set up.

(4) It is confirmed that the unit cleaning cost of buildings with larger facade areas is lower than buildings with smaller facade areas due to economy of scale.

(5) The analysis also confirms that the unit cost of cleaning the facades for buildings with regular shapes is more economical than that for buildings with fanciful irregular-shaped designs.