

Three new courses for the third quarter



Maintenance of common areas in buildings

When:

11, 13, 18 and 20 July 2000

Why:

Among other things, property management involves the day-to-day upkeep of common areas and amenities. The tasks cover void decks, covered walkways, paved areas, drains and landscaping.

What:

This course identifies the common problems encountered and deals with their rectification.

- Water seepage and chemical effects
- Corrosion of metal components
- Pest control
- Problems of external tiling work
- Maintenance and repair of drains
- Surface car parks
- Landscaped and turfed areas

Building survey and inspection for property managers

When:

15, 17, 22 and 24 August 2000

Why:

Concrete is the main structural material in our buildings and property managers need to know its behavior, particularly the causes of its deterioration, affecting its durability and performance. In addition, they need to know how the Building Control Act provides for the mandatory

inspection of buildings.

What:

This course gives an overview of the Act, its relevance to property management and the inspection and repair of concrete structures as required under the Act. A hands-on practical session is included.

Who:

The course is open to any practitioner in the building industry who is currently involved in supervising maintenance work in the private or public sectors. Qualifications of the participants will be NTCs, O-levels, Diplomas and Degrees.

Outline:

- The Building Control Act 1989
- Property manager's role in mandatory inspection of buildings
- How the building is appraised
- Rectification work to the structure ahead of appraisal
- Testing techniques on concrete

Building defects and repairs

When:

12, 14, 19 and 21 September 2000

Why:

To enhance the technical knowledge of the property managers, officers and supervisors involved in the maintenance of residential, commercial and industrial buildings in Singapore.

What:

The knowledge gained by participants will make them more competent in supervising repair work on buildings.

Outline:

Agents of deterioration

Primary and secondary agents lead to the failure of materials in a building. Human agents include designers, contractors and users of the building. Weathering agents include solar radiation, moisture, wind and atmospheric gases. The effects of chemical action on materials will be emphasized.

Concrete

Covers concrete technology, its properties and production. Defects in concrete include cracking and the corrosion of reinforcement, problems associated with corrosion, chemical attack. Repair materials and methods are discussed.

Roofs

Problems associated with flat roofs in Singapore are emphasized. The course covers different types of roofing membranes, sources of failure and rectification, and case studies involving HDB flats and commercial buildings.

Building Façade

Covers the materials used for external walls, brickwork defects and problems with the wall cladding systems used on high-rise buildings. How to maintain the façade.

Finishes

Common types of wall and floor finishes in use locally will be covered together with problems associated with workmanship during installation. How to prevent the problems or rectify them.



**See page 7 for
registration details
and how to request
the forms**

Court holds contractors and architects can be jointly liable for defects and resultant losses

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Introduction

The case of *Lee Sian Teck Chartered Architects v Chuang Uming (Pte) Ltd and Setron Limited* is of significance as its impact will be felt in the manner of allocation of risks between Contractors and Design Consultants.

Facts:

Lee Sian Teck Chartered Architects (“the Architects”) were engaged as the project architects for the project known as Haw Par Technocentre by the owners Setron Limited (“the Employers”). Chuang Uming (Pte) Ltd were appointed as the Main Contractors (“the Contractors”) for the project. Construction work began in November 1990 and the project was completed in March 1992.

Two months after the project was completed, some of the ceramic tiles covering the façade of the building began to pop out or “de-bond”, falling to the ground. No repair works was carried out as the Contractors and Architects blamed each other for the damage. Eventually, the Employers engaged other contractors to remove and replace the defective tiling entirely.

Meanwhile the Architects issued interim certificates for the work done. These were subsequently revised by them to take into account the defective works.

The Contractors commenced proceedings against the Employers, claiming the amount due under Certificate No. C 18. The Employers contended that they were not obliged to make payments on the defective façade and instead counter-claimed damages for breach of contract and/or negligence. In turn, the Contractors blamed the Architects for the defects in the façade. As a result, the Architects were joined as a third party to the action by the Employers.

Trial judge’s findings

The trial judge dismissed the Contractors’ claim and allowed the Employers’ claim for damages against both the Contractors and the Architects. He held that they were jointly liable for the defective tiling of the façade, but liability was apportioned as 20 per cent to the Contractors and 80 per

cent to the Architects. Both parties were also allowed recourse to each other for contribution. Damages for joint liability were set at \$1,979,526.18.

On appeal

The Contractors and the Architects each filed separate appeals on the issues of joint liability, apportionment of liability, and the quantum of damages awarded. The Court of Appeal dismissed the Contractors’ appeal and allowed the Architects’ appeal in part, revising the apportionment of liability from the decision of the lower court to a 50-50 basis.

It held that defective design of the tiling and defective workmanship were both responsible for the tile de-bonding. There was substantial overlap in the effects on the tiling defects, making it difficult to determine the primary cause. As such, the Contractors and the Architects were held equally to blame, and liability apportioned at 50 per cent each.

For the same reason that the damage formed indivisible parts of the entire damage, joint liability was appropriate. Separate liability in separate judgements could only be given if the damages caused could be identified and isolated as each party’s own negligent act or breach. On the facts, as both the Architects’ design and the Contractors’ workmanship were flawed a joint judgement was inevitable.

Editorial comments by Chan Tan and Partners

Allocation of risks:

The case is of some significance to the construction industry as its impact will be felt in the manner of allocation of risks between Contractors and Design Consultants. Although the Court of Appeal dealt with various other issues, this editorial will be restricted to the issue of joint liability of the Contractor and the Design Consultant.

In the above case, the Court of Appeal, by affirming the decision of the Trial Judge, has firmly established the principle of joint liability on the part of the Contractor and the Design Consultant to the

Employer for defects in the works arising from both their default. As such, it held that a joint judgement should be entered against both, instead of separate judgements entered against each.

Effect of joint judgements in law:

Where separate judgements are entered against each of the parties, the Employer can enforce the judgement against that particular party only. If that party fails to satisfy the judgement, the Employer cannot look towards the other party to satisfy the same.

On the other hand, in the case of a joint judgement, both parties are jointly and severally liable to the Employer for the full sum under it. The Employer can choose to enforce the joint judgement against either party for the full judgement sum, regardless of any apportionment of liability between the parties by the Court. Should one party satisfy the joint judgement in full, he would be entitled to seek contribution from the other to the extent of the other’s share of liability under the joint judgement.

The concept of “indivisible parts of the damage”:

The Court of Appeal held that the Architect and the Contractor may be held jointly liable in circumstances where both were responsible for the damage and such damage could not “in reality be easily identified or isolated but constitutes indivisible parts of the entire damage”.

From the judgment of Thean JA:

“In cases, such as this, where the damage or injury was occasioned by more than one party, the question whether there should be a joint judgement or separate judgements depends essentially on the facts and in particular on the damage caused. Where the damage caused can be so identified and isolated as to be attributable to the negligent act or the breach of contract of each party, then a separate judgement in respect of that damage can be entered against each of the parties. Where, however, the damage caused by the parties cannot be so identified and isolated, and

in reality forms indivisible parts of the entire damage, we do not see how separate judgements can be entered against them separately. Reverting to the facts in this case, clearly both the defective workmanship and the defective design contributed to the debonding of the tiles. We are in agreement with the learned judge that the breaches of the Contractors and the Architects 'indisputably, overlap and interweave' and both contributed to the same damage."

Apportionment of liability between the parties:

Further, in a joint judgement, the apportionment of liability by the Court between the Architect and the Contractor inter se would not affect their liability to the Employer to satisfy the joint judgement in full.

As held by Thean JA,

"In such a case, a joint judgement is the natural result as there is no reason, in principle, to limit the Owner to recovering only part of the loss from one party and the remaining part from the other. The apportionment of the liability between the Contractors and the Archi-

itects in percentage terms is not a logical corollary of the separate breaches of contract, but a device to ensure that justice is done as between the Contractors and the Architects inter se."

As such, even though the Court had deliberately apportioned liability between the Contractor and the Architect in percentage terms, their liability towards the Employer was not affected in any way.

With all due respect to the Court of Appeal, although the stated rationale for the apportionment of liability between the parties by the Court was intended to ensure an equitable distribution of liability between the defaulting parties, this is of little or no comfort to the party seeking contribution from the other as in the case of one party failing to satisfy his share of liability under the joint judgement, it is unlikely that he would be able to provide any contribution to the other party.

Consequences of decision:

Under the joint judgement, the Employer can look towards either party to satisfy the joint judgement in full. The Employer would obviously choose to enforce the judgement sum against that party which

appears to be in a financial position to satisfy the judgement or where that party cannot afford the commencement of execution proceedings against it because of the potential damage to its reputation or because of its effect on its financial or contractual commitments. Further, should the Employer proceed against both parties under the joint judgement and one is unable to satisfy his share of liability, the Employer would invariably look towards the other to satisfy that defaulting party's share of liability.

In this sense, by virtue of his liability under the joint judgement, the Contractor is effectively liable for deficiencies or defects in the design by the Architect which had contributed to the damage. Similarly, under a joint judgement, the Architect is effectively liable to the Employer for the Contractor's default in his works where this had contributed to the damage.

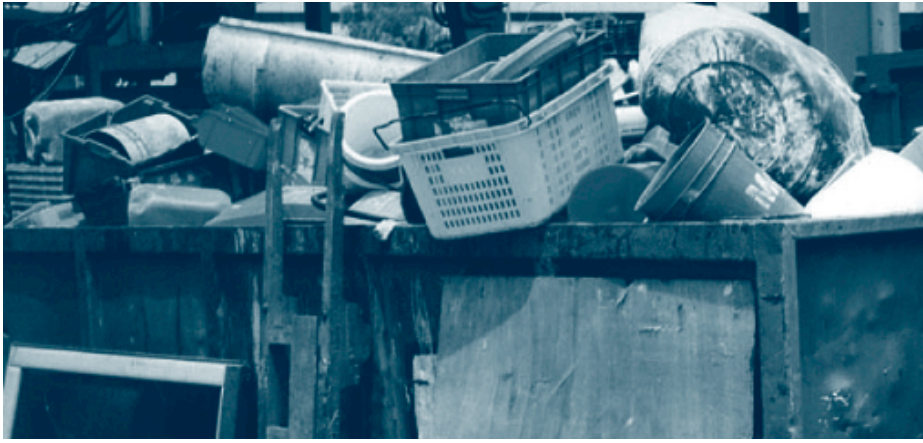
Although in the above case, the Court held, on the facts, that both the Architects and the Contractors were each 50 per cent liable for the damage, the actual quantum of liability between the parties inter se is irrelevant under a joint judgement in so far as their liability towards the Employer is concerned. Accordingly, even if the Architect was found only to be 5 per cent liable and the Contractor 95 per cent, the Architect would nevertheless be liable to Employer for 100 per cent of the judgement sum. Similarly, the Contractor would be liable under the joint judgement for the full judgement sum even though the damage may have been caused primarily by defective design.

The key consideration for the Court in imposing joint liability is whether the damage or defects as caused by both are "indivisible and cannot be readily identified or isolated". If this criteria is satisfied, a joint judgement can be entered against both.

The impact of this decision is to expose both the Contractor and the Design Consultant to risks which were clearly not contemplated by either prior to this decision.

The amount of damage, which may be claimed by the Employer in having to rectify the defect and the consequential losses arising from the defect (including, for instance, loss of rental or financing charges) may be considerable. As such, both the Architect and the Contractor in light of this decision have to consider carefully the shift in the sharing of risks from that traditionally assumed by each of them to include this additional liability under a joint judgement for defects in the works.





Mixed plastics of various types waiting to be sorted.

Solid waste management in Singapore

By Quek Leng Chuang, B.Eng Chem (Hons), MBA, a consultant with Environment Solutions (Asia) Pte Ltd

Abstract

Singapore generates more than 8000 tons per day of solid waste, or 1,300 truck loads. Managing such a huge volume of waste in an efficient and environmentally sound manner is no easy feat.

This article discusses the physical movement of the waste and discusses the means that support our current waste management system.

A perspective of the difficulties of recovery and recycling in Singapore is included in the hope that understanding some of these will help us leap to the next level of good solid waste management.

Solid waste

Waste is normally classified by its source of generation. In Singapore solid waste is commonly classified as Municipal Solid Waste (MSW) from residential sources, Industrial Solid Waste (ISW) from factories, Commercial Waste from hotels, office buildings and the like.

Typically, a person in a developed country generates 0.8 to 2 kg of solid waste per day. Singaporeans generate 1.1 kg per day on average.

The fact that each contribution is random makes it relatively difficult to manage. In contrast, waste from a chemicals plant is relatively consistent and its behaviour predictable; it is also usually

generated by people who are trained to handle it, minimizing its potential environmental impact.

Social factors like economic progress, education, regulation will shape the dynamics of solid waste management. Public awareness of pertinent issues is needed.

Solid waste, particularly MSW, is often assumed to be non-hazardous. Wrong. Most of us are guilty of throwing in the trash some old solvent, a dead battery or spent aerosol.

The facilities for the disposal of MSW are not designed to process such sub-

Typical Industrial Solid Waste (ISW) in Singapore.



stances. Most of the more developed countries now make it mandatory to separate such undesirables from MSW, by classifying these as Household Hazardous Waste or HHW.

A study conducted in Germany found that half of the mercury contamination originated from MSW sources such as fluorescent tubes and lamps and batteries containing mercury.

Traditionally, classification by disposal or treatment method is preferred as it emphasizes the need for different handling and disposal and serves as a constant reminder.

With our GDP per capita at more than \$36,000, Singapore should adopt classifications similar to the most developed countries of the world.

Collection

Collection of hazardous solid waste is under stricter regulation because of the potential dangers. Licences issued by ENV have more stringent criteria for collectors. A strict manifest system requires endorsement on removal of hazardous waste from the generators' premises.

Generators must also agree to the final disposal site for treatment – only a few of which have been approved by ENV, most of them privately owned. Solid chemical sludge, spent catalysts, and medical waste fall into this category.

Only a general waste collector's licence is required for the haulage of non-hazardous solid waste to approved sites, most of which are operated by the ENV. Generators should insist on getting tipping tickets as evidence of proper disposal. Illegal dumping, while not rampant in Singapore, still persists. Generators could help stamp it out.

Generators should only engage licensed waste collectors for both hazardous and non hazardous solid waste. Licences and tipping tickets should always be checked.

Storage

For intermediate storage, bins and other receptacles are normally used. These bins come in all shapes and sizes from 30 to 2000 litres. Bins should be chosen for expected use and should come with lids to reduce rodents, flies and other pests.

The ideal bin is a Multipurpose Garbage Bin (MGB) made of High Density Polyethylene (HDPE) of adequate volume, with a top lid that is operated by a foot pedal. Wheel rollers are sometimes added where need for short distance movement is required.

The ideal bin is also moulded with

fittings to work with the lifting devices on collection trucks. Most good sized waste collectors provide such bins for a monthly fee. Plastics bags are no replacement for bins, as they tear easily.

For larger volumes, Open Top Containers (OTC) are used. These are metal boxes that can be carried on trucks. OTCs are normally sized by volume (cubic metres) or height (in feet).

OTCs function best with bulky and dense waste such as demolition and construction trash or used phonebooks. Most waste collectors will rent these bins.

When the waste consists generally of loose materials such as loose paper, leaves, etc, compactors are recommended. A compactor container can be attached to a ram that forces the loose waste into the container.

Compacted waste reduces the frequency of container removal, saving costs. Compactors have an added advantage if disposal charges are based on volume rather than weight.

Bins, OTCs and compactors are normally left in the open prior to truck collection. Covered bin centres are better. They serve as consolidation points for truck collection, provide shelter from the weather and, most importantly, confine environmental impacts that would otherwise be dispersed.

However bin centres are often poorly designed and sited in basements, near food centres, etc. Poor management exacerbates the problems. For example, indiscriminate washing generates waste water that seeps far beyond the bin centre; poorly scheduled collection overloads the centre.

Poor management shows itself in rodents, flies, cockroaches, objectionable odours and storage of recyclables.

Disposal

Incineration is the preferred option in the disposal of MSW, because it can reduce it to 15 per cent of its original volume. The ENV has three incineration plants.

Incineration differs from open burning as waste is burned under controlled and specified temperatures, pressures and air mixtures to reduce formation of undesirable emissions from the stack. Open burning is forbidden in Singapore.

Besides the emissions from the stack, incineration produces ash and slag – from which scrap iron is recovered in Singapore.

ENV's present incineration capacity of 7,000 tons a day will be increased to 10,000 in 2001 and 13,000 by 2005.

Instead of burning, waste can be buried – in cavities lined with imperme-



Typical MSW that is incinerable

able material. The anticipated waste determines the quality of the lining on the landfill site.

In Singapore, the current landfill site is on Pulau Semakau with a land to sea transfer station in Tuas. It receives about 3,000 tons a day of solid waste too bulky for the incineration plants – plus the slag and ash from the incineration plants and other solid waste.



Impermeable lining being installed in a landfill.

All waste received at the landfill must pass a Toxic Characteristic Leaching Procedure (TCLP) which stipulates the allowable expected leachate. Leachate is the water that will seep out of the waste as rainwater soaks through it.

Transfer stations – where waste is collected and consolidated – are used to facilitate transportation. The Kim Chuan transfer station serves as a collection point for waste generated in the eastern part of the island. It also regulates the flow of waste to the incineration plants.

Recycling

There are only two approved facilities in Singapore. One in Tuas receives commingled solid waste from factories, and the other receives horticultural waste.

Other recovery and recycling facilities do not accept solid waste as such. They receive mainly homogeneous recyclables such as scrap iron, copper, electronic scrap and paper. Singapore has one true paper recycler with a pulping mill.

Recycling is a market driven process: The recoverer needs to be able to buy the recyclables at an acceptable rate and use them to produce a product that is profitable. Where there is no local recoverer and the recyclables need to be sent overseas, transportation costs enter the equation.

In Singapore, viable recyclables are a few plastics (but only in small amounts), paper

based materials, iron and steel. Exportable recyclables are aluminium, copper, paper, steel, precious metals, and small amounts of selected plastic.

The various types within a generic group is an operational difficulty for recyclers. For example, different colours of glass cannot be recycled together, nor can different types of plastic.

Normally recyclable plastics are polystyrene (PS), low density polypropylene (LDPE) and high density polypropylene (HDPE).

Separating the different plastic types is extremely difficult for the lay person. Add to that the fact that most recycling plants cannot tolerate any contamination from food, oil or chemicals and you can see the difficulty in increasing the percentage of waste material that is recycled.

The future

Collection systems will probably move toward automated truck collection from bin centres. Recycling activities should be developed based on this assumption.

Collection and operation of incineration and recycling facilities will be privatised. This will probably drive up the cost of disposal (currently \$57 per ton), encouraging stronger recycling efforts.

Educating the public to adopt better environmental practices will help make recycling a sustainable business. Non-traditional commodities such as used textiles, wood waste, etc, may become viable commodities.

The trends point to a society with higher expectations and more consciousness of the environment. It is important to design and build with this perspective as an investment for the future.

Prevent FIRE

Management has an important role in enhancing fire safety standards in buildings

By Captain Nicholas Lee, Licensing and Enforcement Branch of the Fire Safety Board (FSB)

Introduction

Singapore has one of the best fire safety records for buildings in the world. This is due in no small part to the diligence of building owners and managers in upholding strict fire safety rules and regulations in their buildings.

While the Singapore Civil Defence Force (SCDF) formulates, implements and enforces fire safety policies and standards in all buildings, it is the building owners and managers who play an equally important and active role in monitoring and ensuring that their premises meet the fire safety requirements.

As in most countries, there is a small minority of building owners who view fire safety precautions as unnecessary operating expenses. This attitude should

The one man you don't want to have to call on.



not be condoned as this puts the lives of occupants at risk.

Fines for fire safety infringements can be as high as \$10,000 or in extreme cases, premises might be forced to close. Furthermore, the flouting of fire safety rules in a building may deter customers and affect businesses in the building.

International statistics have shown that 70% of businesses which are damaged by fires never recover completely.

This article offers some tips for building management to further enhance the fire safety standards in their buildings and provide the occupants and businesses in their buildings with a greater sense of security.

Fire Emergency Plans

Premises with a gross floor area larger than 5,000 m² or occupant load of more than 1,000 persons need to appoint a Fire Safety Manager (FSM) and draw up a Fire Emergency Plan. This applies to public buildings such as shopping centres and hospitals and industrial buildings.

The main duty of the FSM is to ensure that the building is fire safe and part of the FSM's job is to conduct a daily inspection of the premises to ensure that fire exits are not obstructed and there is no illegal storage of materials.

Fire Emergency Plans must state in detail what procedures should be followed in the event of a fire. The plan must be made known to all occupants in the building.

To ensure the smooth execution of the Fire Emergency Plan in an emergency, a fire drill should be conducted at least once a year. This is to familiarize everyone with the emergency procedures and lessons learned from the exercise can be incorporated into the plan to further improve it.

An annual fire drill will ensure that should an emergency occur, occupants will be able to evacuate the building in a quick and orderly manner.

Some buildings set up Fire Safety Committees comprising representatives



FSB inspector checking a buildings sprinkler system.

from all tenants in a multi-occupancy building and from all departments in a single occupier building. By setting up a committee, fire safety issues can be brought up and dealt with effectively. The committee should preferably consist of the following people: a coordinator, fire wardens, security officers, a telephone operator, the fire fighting team, and the person responsible for isolating the fire alarm.

Common fire hazards

Here are some of the common fire hazards that the Fire Safety Bureau officers from the Singapore Civil Defence Force encounter when conducting inspections:

a Overloaded electrical points

Overloading may cause overheating of the electrical point and result in sparking which may ignite any combustible material nearby.

The limit should be one appliance per point and the electricity should be switched off when not in use.

b Accumulation of rubbish

Poor housekeeping and the accumulation or improper disposal of rubbish can cause fires. A high standard of housekeeping should be maintained at the workplace to avoid creating a fire hazard.

c Flammable liquids

Flammable liquids in open containers will emit flammable vapours. And some have very low ignition temperatures. Flammable liquids should not be left in anything but sealed metal containers.

d Obstructing equipment

Quite often the access to fire extinguishers and hoses are obstructed and are difficult to get to when the need arises.

Fire Safety Bureau officers have also found fire extinguishers removed from their intended positions. Should an emergency occur, occupants will not be able to find the extinguisher in time.

e Illegal storage areas

Sometimes areas such as electrical service rooms, risers, ducts and exit staircases are misused as additional storage spaces and resting areas for maintenance workers or cleaners. And become fire hazards.

f Smoking

Management should seriously consider banning smoking on their premises to drastically reduce the possibility of fires caused by discarded cigarettes.

Fire safety courses

Besides conducting the Fire Safety Manager's course, the Civil Defence Academy also conducts a range of fire safety awareness courses, including chemical safety awareness course and HazMat courses for emergency response teams.

These additional courses will enhance fire fighting and fire prevention capabilities of building management staff.

The full range of courses offered can be obtained from the Corporate Affairs Branch of at the academy, telephone 794 5606, fax 794 5591 or e-mail scdf_cda@scdf.gov.sg



FSB inspector consulting with an FSM.

Conclusion

Fire prevention and fire safety should never be taken for granted. It is a heavy responsibility that the Singapore Civil Defence Force cannot manage alone.

The Force requires the support and co-operation of building owners and management to implement, supervise and maintain proper fire prevention and fire safety measures.

Should an emergency ever occur, these measures could very well mean the difference between life and death for building occupants.

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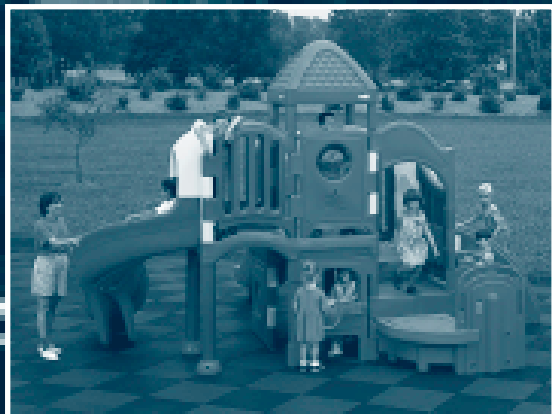
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