

---

# An empirical study of maintenance costs for hotels in Hong Kong

*Received (in revised form): 31 October 2007*

## Kenny Chan

is qualified as Chartered Surveyor, Chartered Builder, Quantity Surveyor, Registered Professional Surveyor (HK), and Certified Facility Manager with over 29 years of experience in the property, construction and management areas, providing professional services in property development, project and construction management, facilities/property and maintenance management, building and quantity surveying for various types of organisations and projects at different scales. For the last 12 years, Kenny has been working in higher education offering education and applied research in related areas.

## Abstract

This research aims to explore the empirical inter-relationships among maintenance costs, maintenance strategy, resources allocation, outsourcing strategy, benchmarks and maintenance cost index for hotels in Hong Kong. There seems to be limited literature and research available regarding maintenance, benchmark and cost analysis in the hotel industry, which would render this research more meaningful. Maintenance cost distribution, obstacles of multi-skilling, outsourcing implications, maintenance performance and practices will also be discussed. It is hoped that this research would enable the hotel operators to achieve better maintenance effectiveness and efficiency through various strategies and cost index, which appear not to be widely available in the market. The quantitative research methodology of the questionnaire survey can be conducted by major hotel operators in Hong Kong.

## Keywords:

maintenance costs, outsourcing, maintenance strategy, benchmark, resources allocation, maintenance cost index

*Journal of Retail and Leisure Property* (2008) **7**, 35–52.

doi:10.1057/palgrave.rlp.5100081; published online 18 January 2008

## INTRODUCTION

Maintenance is the effort in connection with different technical and administrative actions to maintain a physical asset in, or restore it to, a condition where it can perform a required function (British Standards Institution, 1993).

As hotels operate 24 h a day all year round, proper management/maintenance of the building structure, fabric, components, finishes and engineering services is crucial to satisfy customers' wants/expectations.

Kenny Chan  
c/o Suite 1115, No.45 Hong Yue St.  
Quarry Bay, H.K.  
Tel: + 78912991  
Fax: 21367114  
E-mail bskhchan@gmail.com

The senior management in hotels have to manage effectively/efficiently these 'infrastructures' like air-conditioning, mechanical ventilation, fire services, lift/escalators, plumbing/drainage, lighting, laundry and catering installations, to deliver quality services and mitigate any breakdowns. It is worth noting that business availability is a common performance parameter to show the probability that an equipment or a system will be available for its as-built functions, calculated from the operating time and downtime (Kelly, 1984).

In today's business environment, the tolerable error margin is narrower and organisations can no longer afford such mistakes and remain competitive or get funded (Cokins, 1998).

Appropriate maintenance strategy and programme appear to be critical, especially to face global competition and stringent cost control to minimise expenditure under a 'lean and mean' situation while sustaining the required quality services. The strategy espoused by an organisation may focus on cost leadership, differentiation or other intents that form the basis of the competitive edge (Porter, 1980).

Through this research, the existing hotel maintenance practices of Hong Kong will be explored, covering the maintenance performance assessment, resource allocation, considerations for outsourcing, attitude towards multi-skilling, maintenance costs and benchmarking. With these data and analysis, it is hoped to formulate some index and key performance indicators for reference by hotel operators to gauge/improve their maintenance management/practices if at all possible. Reference would be made to the set of key performance indicators for facilities management, including subjective and quantitative measures identified by Hinks and McNay (Hinks and McNay, 1999).

## **ESSENTIALS OF MAINTENANCE**

A proper maintenance framework provides an effective tool for cost assignment and tracking cost efficiency. Better knowledge about major cost drivers would enable organisations to optimise the utilisation of resources in their Planned Maintenance (PM) activities. The workforce is a focus on the product produced by individuals and teams rather than a focus on tasks. In addition, the primary objective of PM is the minimisation of the total cost of inspection and repair, and equipment downtime (measured in lost production capacity or reduced product quality). Alternatively, corrective maintenance is often dominated by unplanned events, that is, functional failure, malfunction or breakdown of equipment, which should be avoided.

Since there are different support activities within PM, and maintenance jobs consume the resources of these activities differently, such differentiation has to be captured in building up a PM job cost. The costing framework would also reveal inefficiencies in a maintenance system, and would identify the need for updating maintenance time standards, material requirements and planning activities.

In hotels, the amount of energy use is affected by weather conditions, number of guestrooms and occupancy rate, number of food covers served and the operating efficiency of plants and equipment (Lee *et al.*, 2000). It



is a 'bottom-to-top' process with front-line operator involvement (Campbell, 1995a) in general maintenance to protect his own equipment, with autonomous activities, such as lubrication, cleaning, inspection and minor component replacement. Without a decent control, the energy consumption of fuel oil, gas and electricity, even in a well-managed hotel, will be as much as 457 kWh/yr.m<sup>2</sup>-floor-area (Lee *et al.*, 2000). It is worth noting the results of industrial energy audits and case studies, which indicate that reduction in energy consumption from improved operation and maintenance activities can average between 8 and 12.5 per cent (Thumann, 1999).

## **BENCHMARKING**

Benchmarking was originally defined by the Xerox Corporation in the United States as a management tool for monitoring and measuring its products, services and practices against its competitors in the late 1970s (Pulat, 1994). Benchmarking is one of the most powerful and available performance management tools that can strengthen all business aspects of an organisation.

Nowadays, benchmarking is defined as a process of systematic and continuous measuring and comparing one's business processes against comparable processes in leading organisations to obtain information that will help organisations identify the strengths and weaknesses of their existing performance (Anderson and Pettersen, 1996).

It is generally accepted that good equipment maintenance practices can improve the reliability of the power system; maintenance has become the prominent management issue. Thus, a benchmark process is adopted to search for optimum maintenance practices to improve the overall maintenance effectiveness/efficiencies and for comparison with its peers/competitors.

## **OUTSOURCING**

Outsourcing is a widely researched topic in strategic management, supply chain management, services, manufacturing and operations management (Belinski and Koehler, 1995; Blumberg, 1998; Campbell, 1995b; Fan, 2000; Fitzsimmons *et al.*, 1998; Zeffane, 1995). From a strategic perspective, a sourcing decision can be made by taking into account both the scope and the purpose of sourcing (Kakabadse and Kakabadse, 2000). Through outsourcing, the organisation can devote its scarce resources to developing its core competencies in a bid to sustain competitive advantages (Tsang, 2002). The client is demanding more for less with the removal of risk. The interpreted advantages of the outsourcing strategy identify that this is entirely feasible, with a host of other added benefits. The senior management of most companies cannot ignore an ever-changing business climate; indeed, corporations globally are turning to more fluid organisational forms by aligning their business units with the company's core strengths (Drucker, 1988). The outsourcing of services enables a company's resources and capabilities to be improved by achieving better quality services and a better performance. The

purpose of such a strategy is to improve productivity, increase revenues, lower operating costs and reduce risks.

Outsourcing the services of an entire function, however, might cost more to the company and might be detrimental from a strategic perspective (Dubbs, 1992). While outsourcing is gaining popularity, the number of reported cases of failure is also increasing (Brown, 2002; Copeland, 2001; Crocker, 1999; James, 2000; Van der Werf, 2000). One should be careful in determining the decision-making criteria upon each outsourcing.

Back to the hotel industry, there is limited prior research concerned with outsourcing in the hotel sector (Goldman and Eyster, 1992; Hallam and Baum, 1996; Hemmington and King, 2000; Espino-Rodriguez and Padron-Robaina, 2004; Lam and Han, 2005). This lack of research interest in hotel outsourcing is surprising, as outsourcing has become a significant facet of modern hotel management (Sieburgh, 1992; Rowe, 1994; Hottman and Adams, 1996). Understanding hotels' motivation for outsourcing is important, as an organisation is as important as technology, cost and demand in determining success (Milgrom and Roberts, 1992).

Hotel operators consider that outsourcing has great potential to improve cost, strategy and performance, and thus squeeze operating costs in a tough business environment. Some attempts to adopt strategies for sustaining competitive advantages include downsizing and laying off employees, partnering external agents with expertise to operate certain functions through franchising, contracting out or easing arrangements.

It is suggested that hospitality enterprises should adopt the following strategies: (1) Pass on the increased costs to their consumers by raising the prices. (2) Reduce their total labour force by adopting labour-saving devices and technologies. (3) Hire fewer but more qualified and productive employees. (4) Substitute full-time with part-time employees to eliminate expensive fringe benefits. (5) Reduce the fringe benefits of all full-time employees. (6) Outsource some functions, for example, maintenance works.

A Facilities Management/Manager (FM) would normally resume the entire maintenance works of a hotel. Out-tasking is a common practice in the field of facilities management; its usage outnumbers that of outsourcing (Kleeman, 1994). When applied to asset maintenance, one has to be aware of the pros and cons of outsourcing (Dubbs, 1992; Kleeman, 1994; Embleton and Wright, 1998; Hubbard, 1993). Although FMs want outsourcers to perform well, several outsourced contractors fail to achieve the desired performance. FMs require professional negotiation, financial and interpersonal skills to implement outsourcing to vendors or service providers.

As at a practice/tactical level, once an activity has been identified as non-core, the conventional wisdom is to outsource it to external parties through some contractual arrangements (Fuller, 2002). A major challenge of outsourcing is managing the risk of service agents' opportunism, where Williamson (Williamson, 1975) defines opportunism as 'self-interest seeking with guile'. The service activities to be out-tasked are well-defined tasks. This mode of sourcing is favoured over in-sourcing in situations where it can lower total costs (Williamson, 1985).

When cost efficiency is an issue, the sourcing decision can be guided by application of the transaction cost theory (Williamson, 1985). The sourcing option that will minimise the total cost of transaction (all costs associated with planning, service agreement, work transaction, performance review in the implementation process) should be selected (Bello *et al.*, 1997). Even when an outsourcing decision is driven by cost saving, the importance of monitoring opportunism should not be overlooked (Wathne and Heide, 2000).

During the transactional negotiating process, the business and legal risks would be fairly apportioned between the user and services providers, and supported by good contract management to mitigate risks with decent contract termination. It is quite sure that suppliers/services providers are attempting to deliver the minimum required to generate the maximum profit while aiming to safeguard contract retention.

Sourcing strategies for maintenance are usually: (1) in-sourcing, (2) out-tasking, (3) outsourcing for cost saving and (4) outsourcing for capability. As each of these strategies possesses merits/demerits under various circumstances, a framework for selection and decision criteria should be established. For instance, at the 'work transaction' stage, an out-task job order is triggered by a maintenance need when it is more economical to hire a contractor to deliver the service.

Lastly, to enable a more complete understanding of outsourcing in the hotel industry, other variables worthy of consideration would include (1) the issue of trust (Das and Teng 1998, 2001; Zaheer and Venkatraman 1995; Nooteboom *et al.*, 1997; Seal and Vincent-Jones 1997), (2) strategy (Langfield-Smith, 1997; Williamson, 1999; Nickerson *et al.*, 2001), (3) institutional environment (Roberts and Greenwood, 1997) and (4) social embeddedness.

## **METHODOLOGY**

To establish an understanding of current maintenance strategies and practices in hotels, a questionnaire was designed to collect information from FMs of hotels.

There are five sections of A–E in the questionnaire. The first section contains the hotel data covering the age, class and number of guestrooms in hotels. Section B deals with maintenance payroll and expenditure spent in supporting the hotel business. Section C covers information of maintenance resources allocation. Section D gathers the current maintenance practices regarding the needs for multi-skilling, in-house and outsourcing labour force for maintenance and retrofitting works. Finally, Section E consists of self-assessed questions to evaluate the strength and weakness in maintenance cost management in individual hotels.

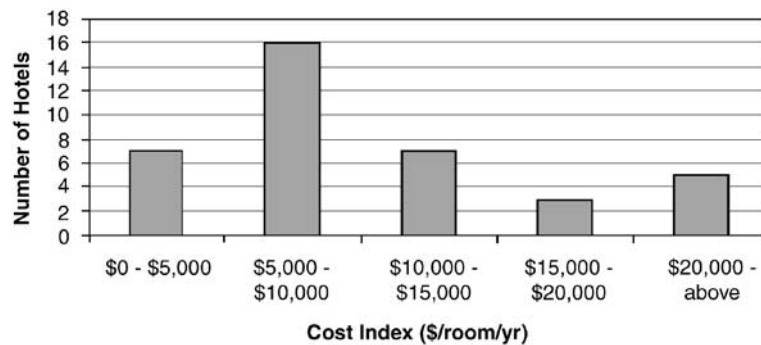
The data would be converted to respective maintenance cost per guestroom, payroll per guestroom, number of guestrooms to maintenance staff, relative proportions of in-house and outsourced costs and maintenance cost index (MCI). These indexes would be categorised into different hotel classes for comparison, whereby peer hotel operators may improve their effectiveness/efficiencies by referring to the current maintenance performance and practices in other hotels.

**Table 1:** Maintenance cost per room

Class of hotel	Maintenance cost per room p.a. (HK\$)			Index
	Maximum	Minimum	Average	
3-Stars	\$10,769.00	\$4,405.80	\$7,652.30	100
4-Stars	\$25,380.50	\$5,216.00	\$7,960.20	104
5-Stars	\$64,955.70	\$6,315.50	\$19,231.50	251
Overall	\$64,955.70	\$4,405.80	\$11,614.67	152

**Table 2:** Maintenance cost distribution

Class of hotel	Maintenance cost distribution (%)					Index
	In-house labour costs (a)	In-house repair works (b)	a+b	Contracted out repair works		
3-Stars	59	17	76	24	100	
4-Stars	30	18	48	52	217	
5-Stars	39	26	65	35	146	
Average	43	20	63	37	154	



**Figure 1:** Maintenance cost distribution

**ANALYSIS OF MAINTENANCE COSTS AND PERFORMANCE**

The questions in Sections A–C of the questionnaire are designed to obtain the general information of the hotels in Hong Kong and their respective maintenance expenditure in 2005. The data are categorised under three different classes of hotels (namely 3-Stars, 4-Stars, 5-Stars). MCI has been established, as benchmark for senior management of respective hotels to forecast the maintenance trends and maintenance overheads, and formulate their maintenance strategies. MCI comprises the costs of in-house labour, materials and all outsourced maintenance works. The results of MCI and cost breakdown from the hotels (41 out of 81) are summarised in Tables 1 and 2.

On average, the maintenance cost per room is \$11,614.67 per room p.a. for the three classes of hotels. It reveals that 5-Star hotels have the highest maintenance cost with an average of \$19,231.50 per room p.a., then the 4-Stars and then the 3-Stars. 5-Star hotels may demand for more resources in maintenance, including associate hotel facilities, for

**Table 3:** No. of rooms per staff

Hotel class	No. of rooms per staff			Index
	Maximum	Minimum	Average	
3-Stars	43	19	33	100
4-Stars	36	18	27	82
5-Stars	32	8	20	61
Overall	43	8	27	82

**Table 4:** Payroll per room

Class of hotel	Payroll per room (HK\$)			Index
	Maximum	Minimum	Average	
3-Stars	\$8,006.80	\$3,589.70	\$5,533.20	100
4-Stars	\$11,749.50	\$2,898.60	\$6,380.60	138
5-Stars	\$35,303.30	\$5,672.20	\$11,876.70	215
Overall	\$35,303.30	\$2,898.60	\$7,930.17	143

example, function rooms, air-conditioning plant, boiler and swimming pool, etc.

It seems that the maintenance of 3-Star hotels is largely performed by in-house staff (76 per cent in-house versus 24 per cent outsourced), while these hotels have the lowest maintenance cost per room (with relatively less/no associate hotel facilities). 4-Star hotels have more associate hotel facilities, and thus would outsource some maintenance works (48 per cent in-house versus 52 per cent outsourced). (PS The number of maintenance staff of 3-Star hotels and 4-Star hotels is almost quite the same.) Apparently, 5-Star hotels fall in between (65 per cent in-house versus 35 per cent outsourced).

The MCI of respondent hotels are shown in Figure 1, where the majority have MCI between \$5,000 and \$10,000 per room p.a. It is reported that for MCI higher than \$20,000, it would be due to major system failure.

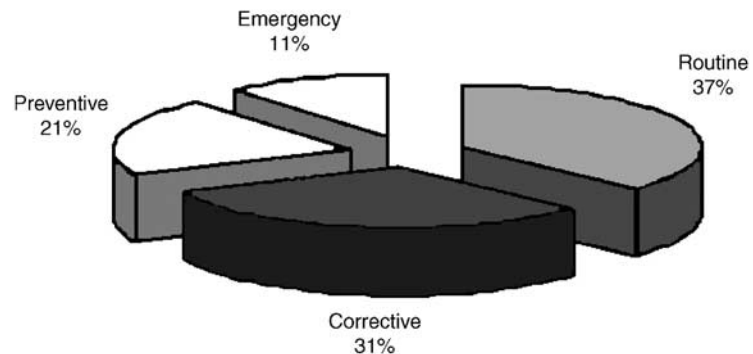
## ANALYSIS OF MAINTENANCE RESOURCES ALLOCATION

In the hotel industry, engineering staff are required to work in shift (three shifts a day for a 24-h cycle). Most manpower/effort will be deployed in the 'day shift', including administration and actual on-the-spot/preventive maintenance works. Such an arrangement would minimise unnecessary disturbance to hotel guests, who would leave the hotels in the daytime. During the mid-day shift and night shift, engineering staff are mainly for tackling equipment failures and emergency calls.

Based on the survey findings, the number of engineering staff in individual hotel ranges from 4 to 39. The ratio of guestrooms per staff ranges from 8 to 43, with an average of 27 to 1, as shown in Table 3. The ratio tends to be the lowest for 5-Star hotels (20), then 4-Star (27) and then 3-Star (33).

**Table 5:** Payroll per staff

Class of hotel	Payroll per staff p.a. (HK\$)			Index
	Maximum	Minimum	Average	
3-Stars	\$217,964.00	\$150,830.00	\$177,390.50	100
4-Stars	\$239,800.00	\$62,900.00	\$176,111.90	99
5-Stars	\$268,965.50	\$158,386.00	\$202,992.50	115
Overall	\$268,965.50	\$130,858.30	\$185,498.30	105



**Figure 2:** Breakdown of maintenance activities

It may be interpreted that more engineering staff are required for 5-Star hotels than others as there are more associate/complex facilities, and higher expectations from customers for better quality services (as they pay higher room rates).

The Payroll per Room and Payroll per Staff are analysed, respectively, in Tables 4 and 5. 5-Star hotels possess the highest Payroll per Room, while the lowest number of Rooms per Staff. 3-Star and 4-Star hotels have quite similar Payroll per Staff (with average \$176,750/staff/year), while 5-Star hotels are 14.9 per cent higher (\$202,992.50). It could be argued that the demand from 5-Star hotels is higher, and pay more as a result.

As stated, the maintenance activities in hotels can be broadly categorised as Routine, Corrective, Preventive and Emergency Maintenance. Routine Maintenance refers to the daily activities of a repetitive nature, such as taking meter readings, lubricating, monitoring, and start-up/shutdown chillers and pumps, etc. Corrective maintenance includes scheduled or unscheduled activities to restore the facilities/equipment to their as-built or normal functions. Preventive Maintenance includes scheduled activities of inspection, adjustment, replacement and overhaul to prevent unnecessary system breakdown with extension to its useful life. Emergency Maintenance refers to immediate actions taken to avoid further facilities/equipment failure, while avoiding adverse consequences such as loss of business.

In the survey, the distribution of these four maintenance activities (in terms of expenditure) is shown in Figure 2.

It appears that quite a substantial cost distribution (37 per cent) is deployed to Routine Maintenance, then Corrective Maintenance (31 per

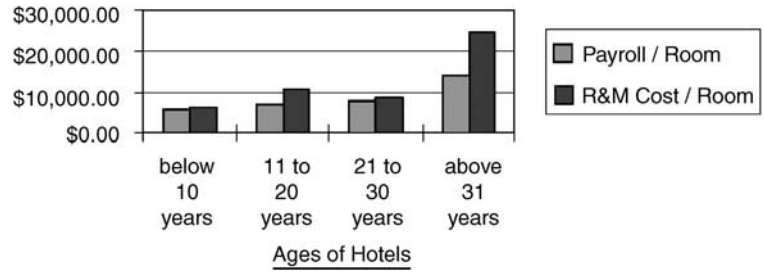


Figure 3: Maintenance cost per room versus age of hotels

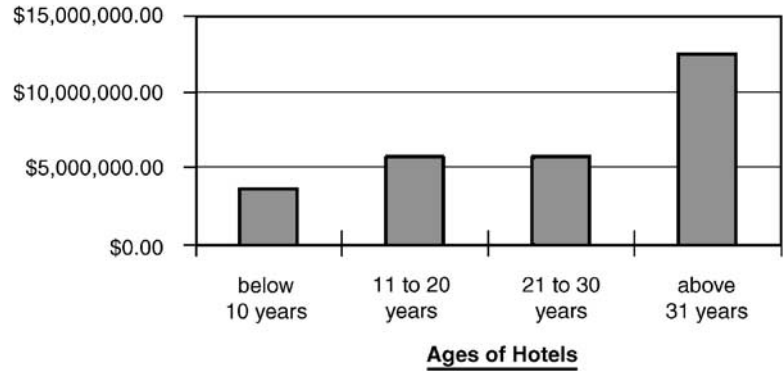


Figure 4: Repair and maintenance cost versus age of hotels

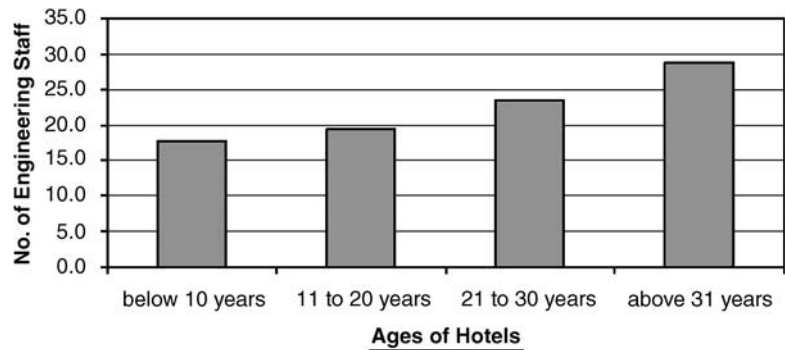


Figure 5: Ages of hotels versus engineering staff

cent), then Preventive Maintenance (21 per cent) and then finally Emergency Maintenance (11 per cent), which is an unavoidable item.

It is observed that, if there is no clear maintenance policy, resources spent on Routine Maintenance may be wasted. System operating parameters should be monitored and compared against the criteria set, and follow-up actions should be taken for non-compliance or facilities/equipment failures.

It is apparent that Corrective Maintenance is about 48 per cent higher than Preventive Maintenance in terms of expenditure used, which may be reduced if PM could be given more emphasis in a hotel's strategic maintenance plan.

**Table 6:** Barriers to deployment of multi-skilling

Description	Percentage of respondents for each scale					Average score
	1	2	3	4	5	
Front-line maintenance technicians' dissatisfaction at doing more tasks	4.88	19.51	21.95	29.27	24.39	3.49
Time constraint on providing adequate internal training	9.76	9.76	26.83	31.71	21.95	3.46
Shortage of manpower to promote and monitor multi-skilling	7.32	12.20	39.02	26.83	14.63	3.29
Financial constraints on supporting the plan of multi-skilling	12.20	29.27	39.02	12.20	7.32	2.73

Furthermore, the Maintenance Cost per Room versus Hotel Age, Repair and Maintenance (R & M) cost versus Hotel Age, and Engineering Staff versus Hotel Age are analysed in Figures 3–5, respectively.

From Figures 3 and 4, it can be seen that the maintenance cost increases steadily for hotels aged from below 10, 11–20 and then 21–30 years, while the maintenance cost increases drastically for hotels aged over 30 years.

From Figure 5, the number of engineering staff increases with the age of the hotel, which seems natural as more staff would be required as the hotels become older.

## ANALYSIS OF MAINTENANCE PRACTICES

Section D of the questionnaire is designed to determine the status of maintenance-related factors. A Likert five-point numeric scale has been adopted, with '1' indicating strongly disagree or insignificant and '5' indicating strongly agree or significant.

## ANALYSIS OF MULTI-SKILLING

Multi-skilling is a form of working arrangement to enhance engineering staff's competency through proper training. Multi-skilled training offers staff the ability to individually undertake a wider range of tasks, and increase the flexibility of allocating day-to-day maintenance duties. This would better enhance staff's ability, enhance the overall quality and reduce staffing costs ultimately.

The score 4.4 indicates that the engineering department will benefit from implementation of multi-skilling (ie each technical staff possesses more than one technical skill). The other score 4.1 reveals that if hotels have a plan of multi-skilling training, direct labours would be reduced and thus there would be a saving in cost.

Mono-skilled staff/technicians are normally less capable of achieving multi tasks owing to inadequate knowledge/skill. To convert them to multi-skilled technicians would require both internal and external training. They may not be eager to accept changes, as they have to make more effort to learn, and subsequently increase their workload.

**Table 7:** Influential factors of decision making for maintenance strategy

Description	Percentage of respondents for each scale					Average score
	1	2	3	4	5	
Health and safety	0.00	7.32	12.20	39.02	41.46	4.15
Energy consumption	0.00	7.32	12.20	41.46	39.02	4.12
Guest expectation	0.00	9.76	9.76	39.02	41.46	4.12
Degree of influence on business activities	0.00	12.20	17.07	34.15	36.59	3.95
Environmental Impact	2.44	4.88	29.27	34.15	29.27	3.85
Hotel policy, objectives and targets	4.88	2.44	26.83	34.15	31.71	3.85
Maintenance resources	2.44	7.32	26.83	34.15	29.27	3.80
Reliability of system	2.44	7.32	29.27	34.15	26.83	3.76
Legal requirements	4.88	7.32	26.83	34.15	26.83	3.71
Criticality of system	0.00	17.07	26.83	31.71	24.39	3.63
System lifecycle	2.44	14.63	26.83	31.71	24.39	3.61
Annual budget	4.88	9.76	29.27	31.71	24.39	3.61
Feedback from other department heads	7.32	12.20	29.27	31.71	19.51	3.44
Manufacturers recommendations	12.20	9.76	26.83	29.27	21.95	3.39
Equipment history records	7.32	19.51	29.27	26.83	17.07	3.27

As shown in Table 6, front-line maintenance technicians' dissatisfaction at doing more tasks (3.49), time constraint on providing adequate internal training (3.46) and shortage of manpower to promote and monitor multi-skilling (3.29) are crucial factors to implementing such a scheme, while financial constraints on supporting the plan of multi-skilling (2.73) does not appear to be very significant.

## ANALYSIS OF DEVELOPING MAINTENANCE STRATEGY PROGRAMME

A maintenance strategy sets the direction of maintenance management, whereas a maintenance programme sets the detail schedule/resources to implement.

In Table 7, the average scores indicate the significance of some key factors concerning by the senior management for developing a maintenance strategy and programme.

Health and safety (4.15), energy consumption (4.12) and guest expectation (4.12) are the main considerations for maintenance decision-making.

Health and safety have become vital requirements for business success, which depend on good maintenance practices to avoid hazards and minimise risks. There are stringent regulations governing the issuance of Hotel License and its renewal by the Hong Kong SAR Government in terms of Building Safety, Fire Safety, Environmental Hygiene, etc.

As the hotel industry is linked to a nation's/country's image, any mishaps would ruin its reputation worldwide.

Energy consumption would no doubt be an essential item to trim down a hotel's operation cost. These could be reduced by constantly implementing an effective Energy Management System and reviewing Energy Saving Opportunities.

Exceeding guest expectations would be crucial in the hotel business. A better maintenance strategy and programme would certainly aid in this aspect.

**Table 8:** Influential factors of considering in-house or outsourcing maintenance

Description	Percentage of respondents for each scale					Average score
	1	2	3	4	5	
Practical skills of in-house maintenance personnel	0.00	0.00	19.51	39.02	41.46	4.22
Expertise from outsourcing	0.00	0.00	19.51	39.02	41.46	4.22
Time constraints	0.00	4.88	12.20	41.46	41.46	4.20
Legal requirements	0.00	4.88	14.63	41.46	39.02	4.15
Availability of in-house labour force	0.00	4.88	29.27	31.71	34.15	3.95
Transfer risk via outsourcing	0.00	4.88	29.27	31.71	34.15	3.95
Use of special tools and testing instruments	0.00	4.88	29.27	31.71	34.15	3.95
Degree of system complexity	0.00	4.88	29.27	34.15	31.71	3.88
Financial constraints	0.00	7.32	29.27	31.71	31.71	3.88
Technical support from manufacturers or suppliers	0.00	7.32	31.71	31.71	29.27	3.83
Use of proprietary units or parts	2.44	7.32	31.71	31.71	26.83	3.73
Historical information	4.88	21.95	26.83	26.83	19.51	3.34

## ANALYSIS OF IN-HOUSE VERSUS OUTSOURCING MAINTENANCE

Maintenance could be performed by In-house direct labour force or Outsourced contractors, or a combined proportion of both, although there seems to be no general guideline on such a proportion.

The survey results of ‘Influential Factors of Considering In-house or Outsourcing Maintenance’ are presented in Table 8. The major considerations are Practical skills of in-house maintenance personnel (4.22), Expertise from outsourcing (4.22), Time constraints (4.20) and Legal requirements (4.15). It seems apparent that the senior management has to strike a balance among these crucial factors to achieve the optimal benefits and/or a sustainable competitive advantage for the hotel organisation as a whole.

More expertised maintenance works that the in-house staff cannot perform would have to be outsourced (eg maintenance of the generator, chiller, boiler). If more immediate attention is required in certain maintenance tasks, in-house staff would be prioritised (and/or trained to perform eg when downtime happens in food/beverage services/equipments). In some cases like licensing or renewal of license, for example, lift/escalator installations (relevant registered lift contractor and registered lift engineer should be employed to pursue the Form 11 certificate to be issued by EMSD in HKSAR), fire protection systems (relevant registered FSI contractor should be employed to do annual checkup as required by FSD in HKSAR); there is no choice but to outsource (a hotel operator cannot afford to keep such personnel just for these annual exercises).

Moreover, the senior management has to carefully compare the actual time (including waiting time and operation time) rendered by an outsourced contractor with that of the in-house staff.

The degree of skillfulness possessed by a specialised contractor is often better (in terms of technical knowledge, skill, equipment, speed, flexible manpower shuffling, etc) than in-house staff, even the latter would be trained.

The next tier of vital factors are Availability of in-house labour force (3.95), Transfer risk via outsourcing (3.95), Use of special tools and testing instruments, (3.95), Degree of system complexity (3.88), Financial constrains (3.88) and Technical support from manufacturers or suppliers (3.83), which are self-explanatory.

The last tier of vital factors is Use of proprietary units or parts (3.73) and Historical information (3.34).

### **ANALYSIS OF MAINTENANCE MANAGEMENT AUDIT**

The senior management has to consider appropriate optimisation of maintenance costs and resource allocation among in-house, in-house plus multi-skilling training and outsourcing. Section E of the questionnaire is designed to obtain a survey on this. More knowledge about maintenance cost distributions (routine, corrective, preventive, emergency) would enable hotel operators to optimise resources. Preventive Maintenance would be more emphasised than Corrective Maintenance, to project better control and reduce system failures, and thus have better control over maintenance expenditure. The costs breakdown would reveal the degree of effectiveness/ineffectiveness and efficiencies/inefficiencies that occurred in the past.

In some cases, hiring a few more-qualified/productive/multi-skilled labour on a part-time basis would help reduce maintenance costs and improve effectiveness/efficiencies; instead of purely relying on long-established in-house full-time employees. Outsourcing some maintenance works that require higher expertise, updated knowledge and advanced equipments could be considered. It is anticipated that further influence regarding incentive, momentum, pressure may be imposed to in-house staff for improvement.

### **ANALYSIS OF BENCHMARKING FOR HOTELS IN HONG KONG**

Benchmarking (and the Index as shown in the above tables) would enable cross-comparison and comparative analysis among respective hotel operators, and would thus assist the senior management to identify their relative status in various areas, providing opportunities for improving services, cost control and others. In addition, the following features are identified:

1. From Table 1, the Index of Maintenance Cost per Room p.a. is 100 (3-Star Hotel), 104 (4-Star Hotel) and 251 (5-Star Hotel), respectively, with an average of 152.
2. From Table 2, the Index of Maintenance Cost Distribution is 100 (3-Star Hotel), 217 (4-Star Hotel) and 146 (5-Star Hotel), respectively, with an average of 154.
3. From Table 3, the Index of No. of Rooms per Staff is 100 (3-Star Hotel), 82 (4-Star Hotel) and 61 (5-Star Hotel), respectively, with an average of 82.
4. From Table 4, the Index of Payroll per Room is 100 (3-Star Hotel), 138 (4-Star Hotel) and 215 (5-Star Hotel), respectively, with an average of 143.

5. From Table 5, the Index of Payroll per Staff is 100 (3-Star Hotel), 99 (4-Star Hotel) and 115 (5-Star Hotel), respectively, with an average of 105 (\$185,498 p.a.), which seems to be a common figure across all three classes of hotels.
6. From Figure 1, the Maintenance Costs per room p.a. represent 18.5 per cent (below \$5,000), 42 per cent (\$5,000–10,000), 18.5 per cent (\$10,000–15,000), 8 per cent (\$15,000–20,000) and 13 per cent (above \$20,000), respectively, in this research.

## CONCLUSION

The success of a hotel relies principally on satisfying customers' wants/expectation through quality of services (hospitality, guestroom, food/beverage, leisure facilities, if any, etc) and also cost control, which subsequently rely on proper hotel management and maintenance management.

In this research, MCI and other crucial factors are explored, aiming to establish some benchmarks within the hotel industry, where there is none so far (perhaps due to competitiveness and commercial secret). The following observations have been made:

1. In general, the room rates of 5-Star hotels are relatively higher, catering for high-paying customers who demand higher quality services. More resources, especially for maintenance, are required, therefore higher MCI, higher Payroll per Room per year and lower Room Number per Staff.
2. 3-Star hotels indicate a higher proportion of In-house staff/cost than Outsourced maintenance cost (76 per cent: 24 per cent); yet, their Maintenance Cost per Room p.a. is \$7,652.30, the lowest among the three classes. 3-Star hotels possess basic guestrooms accommodation and minimal back-of-yard facilities (some guesthouses do not even have back-of-yard facilities, as permitted in HKSAR), whereby In-house maintenance would suffice to serve for that purpose, while customers would not demand higher quality services when compared to 5-Star hotels.
3. Alternatively, 4-Star hotels indicate a lower proportion of In-house staff/cost than Outsourced maintenance cost (48 per cent: 52 per cent); yet, their Maintenance Cost per Room p.a. is \$7,960.20, being the second lowest among the three classes. 4-Star hotels possess better guestroom accommodation and some back-of-yard facilities (as required by HKSAR eg planning standards/guidelines, PNAP 111 issued by Buildings Department), whereby In-house maintenance would not suffice to serve for that purpose, while customers would demand relatively higher quality services when compared to 3-Star hotels. 4-Star hotels would have more resources to split the maintenance workload through outsourcing.
4. 5-Star hotels indicate a 65 per cent: 35 percent proportion of In-house staff/cost to Outsourced maintenance cost; yet, their Maintenance Cost per Room p.a. is \$19,231.50, being the highest among the three classes. 5-Star hotels possess the best guestroom accommodation and

'sophisticated' back-of-yard facilities (some of which may even be exempted from Plot Ratio calculation as encouraged by HKSAR to promote hotel construction at some times), whereby In-house maintenance (average \$12,500 per room p.a.) and Outsourced maintenance (average \$6,731 per room p.a.) would be deployed to the maximum extent to satisfy customers' demand for highest quality services when compared to 4-Star hotels. 5-Star hotels would have even more resources (in terms of cost) to split the maintenance workload through outsourcing.

5. The older the hotels, especially those over 30 years, the more the maintenance cost (average \$25,000 per room; average \$12.5m spent) and the more the engineering staff employed (average 28).
6. The senior management would adopt Multi-skilling to transform mono-skilled staff to minimise maintenance costs, through proper training. According to this research, the major obstacles, as shown in Table 6, are as follows: front-line maintenance technicians' dissatisfaction at doing more tasks (3.49), time constraint on providing adequate internal training (3.46) and shortage of manpower to promote and monitor multi-skilling (3.29) are crucial factors to implement such a scheme, while financial constraints on supporting the plan of multi-skilling (2.73) does not appear to be very significant.
7. For developing a maintenance strategy and programme, the senior management would rate: Health and safety (4.15), energy consumption (4.12) and guest expectation (4.12) as the main considerations for maintenance decision-making. As the hotel industry is linked to a nation's/country's image, any mishaps would ruin its reputation worldwide.  
Energy consumption would no doubt be an essential item to trim down a hotel's operation cost. These could be reduced by constantly implementing an effective Energy Management System and reviewing Energy Saving Opportunities.  
Exceeding guests expectation is crucial in the hotel business. A better maintenance strategy and programme would certainly aid in this aspect.
8. Maintenance could be performed by In-house direct labour force or Outsourced contractors, or a combined proportion of both, although there seems to be no general guideline of such proportion.

More expertised maintenance works that in-house staff cannot perform would have to be outsourced (eg maintenance of the generator, chiller, boiler). If more immediate attention is required in certain maintenance, in-house staff would be prioritised (and/or trained to perform eg when downtime happens in food/beverage services/equipments).

The degree of skillfulness possessed by a specialised contractor is often better (in terms of technical knowledge, skill, equipment, speed, flexible manpower shuffling, etc) than in-house staff, even the latter would be trained.

Moreover, the senior management has to carefully compare the actual time (including waiting time and operation time) rendered by an outsourced contractor with that of the in-house staff.

The senior management has to strike a balance among these crucial factors to achieve the optimal benefits and/or a sustainable competitive advantage for the hotel organisation as a whole.

### **LIMITATION, PROBLEMS, FURTHER RESEARCH**

The following limitations, problems and after-thoughts are worth mentioning hereof:

1. There seems to be limited literature and research available regarding maintenance, benchmark and cost analysis in the hotel industry, where the exposure to relevant literature is restricted.
2. Eighty-one questionnaires have been dispatched to the major hotels in Hong Kong, with 41 replies, which indicates a significant response rate (51 per cent), although the more the better, for more representative results. It has taken considerable time and great care to cross-check, analyse, tabulate and summarise these responses, and yet minor inaccuracies may inevitably be unavoidable.
3. If the questionnaires may be extended further to cover more details, for example, annual income/expenditure accounts, maintenance log, resources record, extent of hotel facilities/equipment, energy costs, staff qualifications/experience, hotel locations, etc, more accurate findings would be obtained. These data, however, especially those sensitive and commercial/financial in nature, are difficult to obtain. Perhaps it may take some time for a more mature society/business environment to open up itself for better knowledge sharing of information for the ultimate benefit of the hotel industry.
4. It would be more fruitful to correlate individual maintenance cost versus various trades, for example, air-conditioning, mechanical ventilation, electrical installations, fire services installations, plumbing/drainage installations, lifts and escalators, gas installations and building structure/fabric/components/finishes. Yet, individual hotels, in most cases, may not keep such detailed records (which is time consuming and labour intensive). Even if it is available, it is difficult to gather for analysis for reasons explained in point 3.
5. Not all hotels adopt advanced Information Technology, for example, a Computerised Maintenance Management System (CMMS) and Building Automation System (BAS), which would greatly enhance the maintenance efficiency/effectiveness of hotels.

© *Kenny Chan*

### **References**

- Anderson, B. & Pettersen, P.G. (1996). *The Benchmarking Handbook: Step by Step Instructions*, Chapman & Hall, New York, NY.
- Belinski, D.S. & Koehler, P.L. (1995). Outsourcing offers nontraditional approaches to managing. *Pulp and Paper*. 69(3), 105–113.
- Bello, D.C., Dant, S.P. & Lohtia, R. (1997). Hybrid governance: The role of transaction costs, production costs and strategic considerations. *Journal of Business & Industrial Marketing*. 12(2), 118–133.

- Blumberg, D.F. (1998). Strategic assessment of outsourcing and downsizing in the service market. *Managing Service Quality*. 8(1), 5–8.
- British Standards Institution (1993). *BS 3811: Glossary of Terms Used in Terotechnology*, British Standards Institution, London.
- Brown, J. (2002). Relationship pointers for outsourcing fans. *Computing Canada*. 28(23), 6.
- Campbell, J.D. (1995a). Outsourcing in maintenance management: A valid alternative to self-provision. *Journal of Quality in Maintenance Engineering*. 1(3), 18–24.
- Campbell, J.D. (1995b). *Uptime: Strategies for Excellence in Maintenance Management*, Productivity Press, Portland.
- Cokins, G. (1998). Why is traditional accounting failing managers? *Hospital Material Management Quarterly*. 20(2), 72–80.
- Copeland, L. (2001). Users look for protection against technology vendor flame-outs. *Computerworld*. 35(47), 19.
- Crocker, J. (1999). Effectiveness of maintenance. *Journal of Quality in Maintenance Engineering*. 5(4), 307–313.
- Das, T.K. & Teng, B. (1998). Between trust and control: Developing confidence in partner cooperation in alliances. *Academy of Management Review*. 23(3), 491–512.
- Das, T.K. & Teng, B. (2001). Trust, control, and risk in strategic alliances: An integrated framework. *Organization Studies*. 22(2), 251–283.
- Drucker, P. (1988). The coming of the new organisation. *Harvard Business Review*. 66(1), 45–53.
- Dubbs, D. (1992). Balancing benefits of outsourcing vs inhouse. *Facilities Design and Management*. 11(8), 42–47.
- Embleton, P.R. & Wright, P.C. (1998). A practical guide to successful outsourcing. *Empowerment in Organizations*. 6(3), 94–106.
- Espino-Rodriguez, T. & Padron-Robaina, V. (2004). Outsourcing and its impact on operational objectives and performance: A study of hotels in the Canary Islands. *International Journal of Hospitality Management*. 23(3), 287–306.
- Fan, Y. (2000). Strategic outsourcing: Evidence from British companies. *Marketing Intelligence & Planning*. 18(4), 213–229.
- Fitzsimmons, J.A., Noh, J. & Thies, E. (1998). Purchasing business services. *Journal of Business & Industrial Marketing*. 13(4/5), 370–380.
- Fuller, N. (2002). Beyond the core. *Supply Management*. 7(20), 39.
- Goldman, K.L. & Eyster, J.J. (1992). Hotel F&B leases: The view from the restaurant. *The Cornell H.R.A. Quarterly*. 32, 72–83.
- Hallam, G. & Baum, T. (1996). Contracting out food and beverage operations in hotels: A comparative study of practice in North America and the United Kingdom. *International Journal of Hospitality Management*. 15(1), 41–50.
- Hemmington, N. & King, C. (2000). Key dimensions of outsourcing hotel food and beverage services. *International Journal of Contemporary Hospitality Management*. 12(4), 256–261.
- Hinks, J. & McNay, P. (1999). The creation of a management-by-variance tool for facilities management performance assessment. *Facilities*. 17(1/2), 31–53.
- Hottman, R. & Adams, J. (1996). Go with what you know: Outsourcing? Reality or myth? *Bottomline*. 11(7), 22–23.
- Hubbard, G.M. (1993). How to make that tough outsourcing decision work for you. *Facilities Design and Management*. 12(7), 46–54.
- James, G. (2000). How companies court disaster in outsourcing deals. *Computerworld*. 34(44), 41.
- Kakabadse, A. & Kakabadse, N. (2000). Sourcing: New face to economies of scale and the emergence of new organizational forms. *Knowledge and Process Management*. 7(2), 107–118.
- Kelly, A. (1984). *Maintenance Planning and Control*, Butterworths, London.
- Kleeman, W.B.J. (1994). Out-tasking: more widespread than outsourcing in the USA. *Facilities*. 12(2), 24–26.
- Lam, T. & Han, M. (2005). A study of outsourcing strategy: A case involving the hotel industry in Shanghai, China. *International Journal of Hospitality Management*. 24, 41–56.
- Langfield-Smith, K. (1997). Management control systems and strategy: A critical review. *Accounting, Organizations and Society*. 22(2), 207–232.
- Lee, R.H.K., Chan, K.T. & Burnett, J. (2000). Identifying daily load profiles and energy saving opportunities for hotel operation. *HKIE Transactions*. 7(2), 29–34.
- Milgrom, P. & Roberts, J. (1992). *Economics, Organization and Management*, Prentice-Hall, Englewood Cliffs, NJ.
- Nickerson, J.A., Hamilton, B.H. & Wada, T. (2001). Market position, resource profile, and governance: Linking Porter and Williamson in the context of international courier and small package services in Japan. *Strategic Management Journal*. 22(3), 251–273.
- Nooteboom, B., Berger, H. & Noorderhaven, N.G. (1997). Effects of trust and governance on relational risk. *Academy of Management Journal*. 40(2), 308–338.

- Porter, M.E. (1980). *Competitive Strategy*, The Free Press, New York, NY.
- Pulat, B.M. (1994). Benchmarking is more than organized tourism. *Industrial Engineering*. 26(3), 22–24.
- Roberts, P.W. & Greenwood, R. (1997). Integrating transaction cost and institutional theories: Toward a constrained-efficiency framework for understanding organizational design adoption. *Academy of Management Review*. 22(2), 346–374.
- Rowe, M. (1994). If you can't beat 'em, join'em. *Lodging Hospitality*. 49(13), 57–59.
- Seal, W.B. & Vincent-Jones, P. (1997). Accounting and trust in the enabling on long term relations. *Accounting, Auditing and Accountability*. 10(3), 406–432.
- Sieburgh, J. (1992). The time is right for outsourcing. *Lodging Hospitality*. 48(6), 57.
- Thumann, A. (1999). *Plant Engineers and Managers Guide to Energy Conservation*, Fairmont Press, Lilburn, GA, p. 503.
- Tsang, A. (2002). Strategic dimensions of maintenance management. *Journal of Quality in Maintenance Engineering*. 8(1), 7–39.
- Van der Werf, M. (2000). How the U. of Pennsylvania learned that outsourcing is no panacea. *Chronicle of Higher Education*. 46(31), 38–39.
- Wathne, K.H. & Heide, J.B. (2000). Opportunism in interfirm relationships: forms, outcomes, and solutions. *Journal of Marketing*. 64(4), 36–51.
- Williamson, O.E. (1975). *Markets and Hierarchies*, The Free Press, New York, NY.
- Williamson, O.E. (1985). *The Economic Institutions of Capitalism*, The Free Press, New York, NY.
- Williamson, O.E. (1999). Strategy research: Governance and competence perspectives. *Strategic Management Journal*. 20(12), 1087–1109.
- Zaheer, A. & Venkatraman, N. (1995). Relational governance as an inter-organizational strategy: An empirical test of the role of trust in economic exchange. *Strategic Management Journal*. 16, 373–392.
- Zeffane, R. (1995). The widening scope of inter-organizational networking: economic, sectoral and social dimensions. *Leadership & Organization Development Journal*. 16(4), 26–33.