

## TQM in Construction through 5-S Practice: A Malaysian Case Study

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### ABSTRACT

*It has been well-recognised that Japanese construction firms are good in safety, hygiene, quality, productivity and image. Over the last century, the Japanese have formalised the technique and name it as '5S' Practice. Through his research in Japan in 1988, the author has re-define the name as '5-S' and developed the world's first 5-S Audit Checklist. Since 1993, he used the proprietary 5-S Checklist developed at SIRIM for training and consultancy in no less than 20 countries with over 100,000 persons from around 8,000 organisations world-wide. The objective of this paper is to explain the intricacy of the 5-S so that it can be understood easily and adopted readily by those who may find the tool useful. The valuable experience of a major case study will be shared in this article. It is hoped that this article can provide a solid evidence for the construction industry in Malaysia to take up this important and effective tool for quality improvement.*

**Keywords:** 5-S Practice, Safety, Health, Quality, Productivity, Environment, Image, Malaysia, Construction, Case Study

### 1. Introduction

The 5-S is a first step towards TQM. Over the last century, the Japanese have formalised the technique and name it as the 5S (#) Practice (Osada, 1991). Prof. Sam Ho has improved and defined its terms in English and developed the world's first 5-S Audit Checklist in 1993 (Ho & Lee, 1994). In 1998-2000, a US\$600,000 grant was given to train up 2,500 5-S Lead Auditors in Hong Kong. By now, over 100,000 people have been trained, with over 8,000 organisations, around half of which have been certified as the 5-S Registered Organisation.

*# As differentiated from the Japanese '5S', the one created in this paper is named as '5-S'.*

**Table 1: The 5-S in Summary**

*(\* created by the Prof. Sam HO in 1994 as Quality Expert under the Asian Development Bank TQM project for Malaysia)*

Japan 5S	SIRIM 5-S *	SIRIM 5-S in Malay *	五常法 *	50-pts. *	Typical Example * (from the 50-pts.)
Seiri	Structurise	Struktur	常組織	10	Throw away rubbish & return to store
Seiton	Systematise	Sistematik	常整頓	10	30-second retrieval of a document
Seiso	Sanitise	Sanitis	常清潔	5	Individual cleaning responsibility
Seiketsu +	Standardise	Standard	常規範	15	Transparency of storage & Fool-proof
Shitsuke	Self-discipline	Sentiasa disiplin-diri	常自律	10	Do 5-S daily & 5-S Audit

+ Original meaning 'Cleanliness', has been replaced with 'Standardise'.

#### 1.1 Company Background – Setiakon Builders Sdn. Bhd. (SKSB)

SKSB was established on 12 December 1994. The initial core business is work as sub-contractor in the building industry, focusing on civil engineering and infrastructure works. After few years, with strong belief and conviction in the construction industry, we are growing stronger and we feel proud on invitation from major players in building industry. As a result, we had forged strong strategic alliances with many of them. Thanks to them, we gain a lot of experience and take a giant leap moving forward.

Since cooperated with those major players, we started involved ourselves in some notable mega projects in past 20 years like:

1. Tropez Residences - Danga Bay, Johor

2. Tropicana Gardens - Kota Damansara, PJ
3. Glomac Damansara Residence - Damansara KIM
4. Mirage Residences - Kuala Lumpur
5. Sewerage Treatment Plant – Cyberjaya
6. Kuala Lumpur Flood Mitigation - Kuala Lumpur
7. Prince Court Medical Centre - Kuala Lumpur
8. CIQ Complex - Johor Bahru, Johor

With our continuous improvement and innovation, SKSB is able to adopt the latest construction techniques, technologies, products, and materials into our projects. With these, we able to provide the most practical, efficient and commercial constructs for our clients. In result, our clients feel satisfied enough and reliable to our services from the start until the end for every single project.

**Vision:** As the preferred Main Contractor for our clients.

**Mission:**

- ◆ To build and shape a better living environment
- ◆ To deliver projects that exceed the expectations of our clients
- ◆ To provide rewarding careers and personal development opportunities to our staff

**Value:**

Safety First

Knowledge & Innovation

Sustainable Development

Best Quality

**Project covered by this paper certified under I5SO-STS 5-S**

*I5SO = International 5-S Organisation (registered in the HK SAR)*

*STS = SIRIM Training Services (a 100% subsidiary of SIRIM Bhd., Malaysian Government)*

**Site Address:** D'Sara Sentral @ Sungai Buloh, Selangor Darul Ehsan.

**Contract Period:** 34 Months (Jan 2015 – Sep 2017)



## 1.2 5-S Vision

Leveraging on our expertise and strong track record, we continue to aggressively pursue new horizons. Our 5-S Vision is *to become the preferred contractor in Malaysia by the measure of Safety-Health, Quality, Productivity, Environment & Image via the 5-S Practice, and the 1<sup>st</sup> SIRIM 5-S Registered Mixed Development in Malaysia.*

In order to achieve the above Vision, we are now determined to introduce and educate our employees with 5-S Management. 5-S is also the fundamental to all our S-H-Q-P-E-I programmes as illustrated in the following diagram (Ho, Yong, Azman, Jul 2011).

**5-S → ISO 9001 / ISO 14001 / OHSAS 18001 → TQM**

## 1.3 5-S Mission

The training and implementation of the 5-S standards for the above Site aims at cultivating “**Structurise, Systematise, Sanitise, Standardise and Self-Discipline**” practice into our work environment. This will ensure that the organization will achieve high Health (H) / Safety (S), Quality (Q), Productivity (P), Environment (E), and Image (I) performance in order to become the industrial leader. Moreover, 5-S will also help the staffs to develop self-discipline and improve the quality of their working life.

5-S shall be introduced to fulfill the **S/H-Q-P-E-I** Mission as follow:-

- (a) **S**afety & **H**ealth: To ensure a safe and healthy working environment via the 5-S practice by all staffs & Sub-contractors at our workplace.
- (b) **Q**uality: By encouraging 5-S cross audit to create a continuous improvement culture for internal staffs and sub-contractors for better quality output to meet customer satisfaction.
- (c) **P**roductivity: As a result of 5-S implementation, employees’ work productivity will be improved and wastage will be minimised.
- (d) **E**nvironment: To reduce & prevent environmental pollution, to apply 3R practice to manage our construction wastes, and to conserve energy & resources.
- (e) **I**mage: 5-S practice helps build the positive culture & the green, clean, friendly & efficient workplace to project the impressive professional image of our organization.

Our 5-S Motto is:-

***Construct DS-Site with 5-S Mixed-Development!***  
***Build MS-SK with Quality Landmark!***

## 2. Establishing Standards

The “50-point 5-S Checkpoints” and the objectives of our Quality (Q), Safety & Health (S/H), Environmental (E), Productivity (P) and Image (I) performance are the standards upon which the company can develop its mission and value. In addition to the 50 points derived from the 5-S standards, which are listed on the 5-S Audit Checklist, the Company 5-S Committee should set up its own standards and conduct staff trainings via on-site photographs and labeling activities. Internal 5-S Audits and SIRIM Certification Audits were carried out to ensure the 5-S principles and practices are being properly and positively delivered by everyone, everyday for work environment improvements. (Ho, Idris, Yong, Oct 2011)



## 2.1 The 5-S Principles

### Structurise

It is essential to discard unnecessary items or return them to stores for storage. Necessary items should be clearly classified and stored under high-medium-low usage according to usage frequencies. The application of 'Centralization Storage' and 'One-is-best' will help minimizing stock level.

### Systematise

This is a study of efficiency. It allows you to understand how to adopt the shortest possible time while acquiring or putting away items. It is necessary to define the 'Name' and the 'Home' of every item.

### Sanitise

All staffs should hold accountable for the cleanliness of not only their own work areas, but also sharing other common places surrounding their working environment.

### Standardise

Standardization focuses on the establishment of transparent, visual and green management within the working environment. By utilizing creativity and 'Visual Management', work effectiveness and efficiency will be improved.

### Self-discipline

Everyone working in the organization should implement the above 4-S autonomously. This will lead the organization towards a 5-S work environment in the long run to achieve KISS.

## 2.2 Our Company 5-S Standards

### 1. Structurise (Seiri): Sorting & 1-is-Best

No.	Activities	Company 5-S Standards	Target*
1.1	Throw away/return things which are not needed (> 1 year).	<i>Remove or store away all materials, plants, machinery &amp; equipments not needed.</i>	HS
1.2	<b>3-R: Reduce, Re-use and Re-cycle</b> , paperless, etc.	<i>Segregate construction &amp; domestic wastes, and dispose off at designated places.</i>	E
1.3	"Needed things" stored by: low, medium & high usage/weight.	<i>Store away all materials &amp; equipments according to frequency of usage &amp; weights.</i>	P
1.4	Minimum Personal belongings & kept them neatly.	<i>Keep minimum personal belongings, and keep them neatly at centralized place.</i>	HS
1.5	Pay attention to defects, leakage, breakage and overcome their root causes.	<i>At the end of work, ensure all tools and facilities are in good working condition.</i>	HS
1.6	One-is-best #1: Daily "Things-to-do" List	<i>Prepare "Daily Thing-to-do List".</i>	P
1.7	One-is-best #2: one set of tools/stationery/1-page form	<i>Every worker is equipped with the set of tools he need for the task.</i>	P
1.8	One-is-best #3: one hour meeting (be concise)	<i>Always ensure meetings are short &amp; effective, whenever possible.</i>	P
1.9	One-is-best #4: one stop service for customer	<i>Promote "One Top Service" approach, when handling customers or visitors.</i>	Q
1.10	One-is-best #5: one location for files, server & material	<i>Ensure centralized storage of material, tools, vehicles &amp; info, whenever possible.</i>	P

### 2. Systematise (Seiton): Labeling & Speed

No.	Activities	Company 5-S Standards	Target*
2.1	Everything has a clearly designated name	<i>Every plant, machinery, equipment, tool, stocks</i>	Q

	& place	& inventory must have a name and a home.	
2.2	Every place should have a 'responsible person' label	Every workplace has a Person-in-Charged (PIC).	Q
2.3	Security for entrance / cabinets /rooms & key management.	Appropriate security check at entry points; provide proper system to manage your keys.	HS
2.4	Functional placement for leaflets, tools and material	Use appropriate receptacles with label to keep your tools, spare parts, raw materials, stationery, etc	P
2.5	Filing standards and control master list	All documents & record to be kept accordingly to PFI (Project Filing Index).	P
2.6	First in, first out (always: left in, right out)	All handling & storage of materials to follow FIFO/LILO approach.	P
2.7	Zoning, placement marks, signage and badges	Identify work zones/office/ rooms /desks/ routes/passageway with labels & signage.	E
2.8	Neat notice boards (include zoning & labels)	Information in the Notice Board to be classified and grouped according to subject matters & PIC.	I
2.9	Easy-to-read notices (include expiry date)	Each notice on a Notice Board must have a subject title, reference no, expiry date & PIC.	P
2.10	30-second retrieval of tools, document & parts	All arch file folders to be properly labeled & color coded.	P

### 3. Sanitise (Seiso): Cleaning & Inspection

No.	Activities	Company 5-S Standards	Target*
3.1	Individual cleaning responsibility assigned	Every staff and workers to practice "Daily 5S" for his workplace	HS
3.2	Make cleaning and inspection easy (15cm)	Ensure bottom of shelf to be 15cm above floor level	E
3.3	Clean the places most people do not notice	Do not ignore regular sweeping for obscure places or corners.	E
3.4	Cleaning inspections and correct minor problems	Keep cleaning record for tracking of performance	Q
3.5	Regular sparkling cleaning campaigns	Ensure all floors are clean & free from rubbish, stains, ponding water & littering at all time.	E

### 4. Standardise (Seiketsu): Safety & Best Practices

No.	Activities	Company 5-S Standards	Target*
4.1	Transparency (minimize doors, covers & locks)	Provide "see through" door/cabinet/room & open shelves for storage of material.	HS
4.2	Straight line, right-angle and leveling arrangements	Ensure stored material & machinery arranged or aligned in straight & square manner.	I
4.3	'Danger' warning, fire extinguisher & exit signs	Display or provide danger warning signs, fire escape route, fire alarm, fire extinguishers, etc.	HS
4.4	Hazardous goods & relevant safety measures for handling.	Display posters: correct handling of hazardous goods; safe use of tools & equipments.	HS
4.5	Work instructions /Method Statement & 'Inspected &Passed' Status.	Keep "approved samples" inside the sample room.	Q
4.6	Electrical switch labels & wiring installation neatness.	Ensure no untidy hanging wires & loose wires; ensure all switches are labeled.	HS
4.7	Energy Conservation: temp limit control, time switch, auto off switch.	"Off" the power supply when not in use	E
4.8	Guidance & Instruction for manual handling/ lifting of equipments.	Put up wall poster for correct manual handling /lifting techniques & relevant precaution.	HS



4.9	Colour & Visual Management for paper, files, containers, etc.	Provide bright /reflective barricade/fenders for diversion of traffic & pedestrian.	HS
4.10	“5-S responsibility” incorporated into floor plan or on actual work floor.	Prepare floor layout plan showing work zones & PIC.	Q
4.11	Operate within noise/vibration limits; avoid hazards & ensure food safety	Regular service & maintenance of machines, equipment, and cleaning of utensils.	HS
4.12	Comply with Safety Policy and carry out Hazard & Risk Assessment.	Carry out HIRADC analysis for high risk activities, before commencing work.	HS
4.13	Fool-proofing or Fail-safe (Poka-yoke) Practices.	Provide “easy to understand” directional sign (Eg. fire escape route, staircase).	HS
4.14	Park-like green environment (garden office/factory)	Provide green colour safety netting.	I
4.15	5-S & OSH Museum (photos before/after)	Display photos “before & after” improvement on “5S Museum” notice board	Q

5. Self-discipline (Shitsuke): Quality Culture Development

No.	Activities	Company 5-S Standards	Target*
5.1	Execute individual 5-S responsibilities	Establish everyone’s roles & responsibility, and mechanism to execute it.	Q
5.2	Wear suitable clothing/ helmet/gloves/shoes/etc.	Put on appropriate PPE (Personal Protective Equipment).	HS
5.3	Good communication & phone call (magic-word)	Ensure close communication between project team & sub-contractors/consultants/clients.	Q
5.4	Do 5-minute 5-S Practice daily	Practice “Daily 5-S checklist”	E
5.5	One day processing of job/tasks (see 1.6)	Complete “Daily Thing-to-do List”	P
5.6	First Aid training & Emergency Response Drills (ERD).	Carry out “Emergency Respond Drill” at least once a year.	HS
5.7	Organization Chart and Performance Indicators	Display “Project Organization Chart” and “Mission Statement/QHSE Policy/Objectives”	Q
5.8	Design and follow the 5-S Manual	Document “5-S Manual” & practice.	Q
5.9	Quarterly 5-S Audit and Improvements	Bi-Monthly “5-S” meetings & internal “5-S” audit.	E
5.10	Seeing-is-believing and Keep It Short & Simple (KISS)	Always ensure workplace is safe, neat & pleasant; demonstrate your 5-S Leadership.	I

(KISS = Keep It Short and Simple)

	S/H = Safety & Health	Q = Quality	P = Productivity	E = Environment	I = Image	Total
S-1: Structurise	3	1	5	1	0	10
S-2: Systematise	1	2	5	1	1	10
S-3: Sanitise	1	1	0	3	0	5
S-4: Standardise	9	3	0	1	2	15
S-5: Self-Discipline	2	4	1	2	1	10
<b>Total ➔</b>	<b>16</b>	<b>11</b>	<b>11</b>	<b>8</b>	<b>4</b>	<b>50</b>

2.3 Company 5-S Standardized Photos

The photos taken are regarded as standardized photos; and can be modified subject to any environment changes in the near future.

### **3. 5-S Promotion and Implementation**

McGregor (1960) identified two human attitudes towards work. In his Theory X, he observed that humans dislike work and would like to get away from work if possible. On the contrary, in his Theory Y, he observed that humans actually like working and they work as hard as they can to achieve results. This is the case when people are motivated to do their work. Ouchi (1981) observed many successful Japanese and American firms and found out that people actually consider the organisation as part of their family. The staff in these companies devote so much energy and time to their work that one might think as if it is their own business. This type of devotion to work represents the scope of Ouchi's Theory Z. His research shows that it applies not only to the Japanese but also to American workers.

In order to make a successful and painless transition from Theory X to Theory Y and then to Theory Z organisations should install some degree of discipline in the form of procedures and work instructions. Consequently, self-discipline should be encouraged. Finally, the employees will develop their own self-discipline framework.

#### **3.1 The Establishment of 5-S Management System**

##### **3.1.1 Implementation Strategy**

The typical strategy will be:

- **Objectives: S/H-Q-P-E-I**
- **Visual & Site Management**
- **One-is-Best**
- **Do It Right First Time (DIRFT)**
- **Keep It Simple and Short (KISS)**

##### **3.1.2 Methods of Implementation**

###### **Full Participation**

- All staffs must participate and attend the 5-S Trainings.
- 5-S Committee will be established with the top management support.
- Regular meetings are to be organized to draw out the annual activity plan, review achievements and document relevant records.

###### **Visual Management**

- The establishment of standards, auditing mechanisms, reward & penalty systems, resource budgeting, publicity and promotion strategies.
- In accordance to visual management, the company should divide itself into several 5-S responsibility zones.

###### **Continuous Improvement**

- By participating regularly in “5-S Certification Audit” it will help to ensure Company’s 5-S management standards to be maintained at a high-quality level.
- All staffs are to be involved in the “5-S Day” on the last Saturday of every Odd Month. “5-S Day” might involve games, audits, competitions and visits.

###### **Experience Sharing**

- Experience sharing activities will be encouraged. The Company will not only host site-visiting activities for outsiders to participate, it will also arrange and encourage its staffs to attend the site-visits organized by the HK 5-S Association & SIRIM.

##### **3.1.3 Organizational Structure**

The “5-S Management Committee” (5SMC) will consist of the following parties from the Client, Consultants, Project Management and Supervisory staff.

### 3.1.4 Authorities and Responsibilities

Representatives are chosen from various Grades amongst all staffs to form the **5SMC**.

The duties of the **5SMC** include Promoting, Implementing, Monitoring and Evaluating 5-S operations. Detailed duties are listed as follows:

<b>Position</b>	<b>Qualification</b>	<b>Duties</b>
<b>Chairman</b>	5-S Blue-Belt Certificate	<ol style="list-style-type: none"> <li>1. Co-ordinate and monitor the Annual 5-S Activity Outline.</li> <li>2. Bears the responsibility to develop, prepare and implement each and every programme and publicity.</li> <li>3. Meetings to be held regularly to review related plans.</li> <li>4. Establish “5-S Leadership Core-Group”.</li> <li>5. Encourage competitions and set up a reward and penalty system.</li> <li>6. Evaluate the effectiveness of the 5-S Program.</li> </ol>
<b>Vice Chairman</b>	5-S Blue-Belt Certificate	<ol style="list-style-type: none"> <li>1. Co-ordinate the Annual 5-S Activity Outline.</li> <li>2. Audit organization’s operations regularly in accordance to 5-S Standards and revise it when needed.</li> <li>3. Meetings to be held regularly to review related plans.</li> <li>4. Monitor trainings and assess appointed competent persons regularly.</li> <li>5. Develop “5-S Leadership Core-Group”.</li> </ol>
<b>5-S Auditor</b>	5-S Blue-Belt Certificate	<ol style="list-style-type: none"> <li>1. Assist in the co-ordination of the Annual 5-S Activity.</li> <li>2. Responsible for regular audit activities.</li> <li>3. Co-ordinate and promote 5-S Activities.</li> <li>4. Monitor and report on 5-S implemented areas.</li> <li>5. Assist and guide other staffs to the understanding and implementation of 5-S Standards.</li> </ol>
<b>Members</b>	5-S Blue-Belt Certificate	<ol style="list-style-type: none"> <li>1. Liaison Work</li> <li>2. Clerical work and labeling amendments.</li> <li>3. Provide and record the latest information of the liaison work done.</li> <li>4. Prepare and arrange internal and external visiting activities.</li> <li>5. Record and promote with 5-S information.</li> <li>6. Order and purchase any necessity for the 5-S Committee.</li> </ol>
<b>Other Staffs</b>	5-S Green-Belt Certificate	<ol style="list-style-type: none"> <li>1. Responsible for area and individual 5-S Activities.</li> <li>2. Comply with 5-S Policy and other Q/SH/E policies as deem necessary.</li> </ol>

### 3.1.5 Training and Relevant Tools

3.1.5.1 Educate and train all staffs to promote and implement 5-S Standards into daily operations.

3.1.5.2 All staffs are required to read all 5-S related materials, such as relevant books, notes, videos and photo records.

3.1.5.3 New appointed staffs are to be examined and awarded with the 5-S Green-Belt Certificate within three months.

3.1.5.4 Staffs are allowed to attend any 5-S related seminars and trainings organised by the Company or outsourced.

3.1.5.5 Relevant Training Tools include: 5-S Audit Training Programme DVD, “5-S: Modern Management”, 5-S Audit Checklist and other related materials.



## **3.2 Discipline, Reward and Penalty**

- 3.2.1 Develop reward and penalty schemes to appreciate, recognize or reward/punish the appropriate parties after each Auditing section.
- 3.2.2 Appreciation & Recognition (Pending Management Approval) – “S-S Leadership Core-Group” to regularly recommend people caught with “5-S Good Actions” based on photographic or equivalent evidence. Special designed “5-S Good Action T-Shirts” will be given to such achievers during “5-S Day”.
- 3.2.3 5-S Certification Award Ceremony (Pending Management Approval) – If no failing point was found during 3rd Party “5-S Certification Auditing”, RM4,000 will be given to the project team to host a small celebration party.
- 3.2.4 Penalty – All 5-S Audit Reports will be circulated & published internally in the Company. SKSB Staff who fail to take the necessary ‘5-S action’ needed, may be subjected to relevant department disciplinary action. SKSB Sub-contractors who fail to do so will also be subjected to the penalty imposed by the Safety & Health Department, according to relevant details as spelt out in their respective sub-contract agreements.

## **3.3 Publicity and Promotion**

- 3.3.1 The “5-S Slogan” will be established in accordance with the Company’s 5-S strategy for the introduction and education of its employees. “5-S Museum” will be established & maintained at the Entrance to the project site office.
- 3.3.2 Based upon 5-S philosophy, the Company has committed its project office layout with high transparencies, landscape designs and straight & neat alignment & orientation. Clear signage are also installed to provide all staffs, workers & sub-contractors with a clean, safe, green & conducive working environment.
- 3.3.3 To promote and encourage 5-S experience sharing activities, the Company can, not only organize site-visits and training programme for its staffs to participate, it can also invite other organizations from various industries to pay visits at the Company 5-S implemented areas.

## **4. 5-S Monitoring Mechanism**

### **4.1 5-S Audit Mechanism**

- 4.1.1 Assess 5-S Audit according to the Audit Plan. (Ho, Ghani & Azman, Mar 2015)
- 4.1.2 Audit in accordance to the Company’s Audit Standards. **(2.2: Company 5-S Standards; 2.4: Company 5-S Audit Checklist). Quarterly 5-S Audit aiming at cumulative OB+NC < 30.**
- 4.1.3 Record in details for any auditing work done. If any Non-Conformance points appeared within the reports, the Company 5-S Committee leaders are to distribute the responsibilities to relevant staffs concern for further correction within a set time so to ensure such failing points can be prevented in the future. Corrected parts are to be re-audited, recorded and illustrated during the 5-S Meetings.

### **4.2 Monitoring and Improvement**

- 4.2.1 Hold regular 5-S Meetings, Internal Audits and Certification Audits.
- 4.2.2 The effectiveness of 5-S implementations at the workplace and the relevancies of current measures and Audit Standards are to be discussed and reviewed during each 5-S Meeting. Appropriate amendments could be made when irrelevant audits were found.

#### 4.3 Evaluation

Based on available statistics compiled, the HS-Q-P-E-I performance achieved for the project shall be reviewed during Annual 5-S Conference or MRB (Mgt Review Board) Meeting chaired by MD.

#### **Safety & Health (S/H)**

**A. Staff & Worker OHSE Induction:**

The project to ensure 100% of SKSB site staff & workers for the project have attended the “OHSE Induction Course” organized by Safety & Health Department. ‘NC’ – 0 ‘OB’ <10 from DOSH.

**B. Zero Notice of Prohibition (NOP):**

The project to achieve Zero NOP for OHS matters from DOSH or other relevant authorities.

**C. Zero Accident:**

Aim at Zero Accident throughout the course of the project.

#### **Quality (Q)**

**A. Workmanship:**

The project to achieve CONQUAS score of at least 65-73%.

**B. Defect Liability Period:**

The project to achieve CMGD (Certificate of Making Good Defects) at the expiry of Defect Liability Period (DLP) specified in the Contract with client.

#### **Productivity (P)**

**A. Project Progress:**

The project to ensure “Actual Progress S-Curve” must not lag “Scheduled Progress S-Curve” by 3-5% variation every month.

**C. Delivery:**

The project to achieve CPC (Certificate of Practical Completion) at the required date specified in the Contract with client.

**B. Cost Control:**

The project to be completed within given budget.

#### **Environmental (E)**

**A. Legal Compliance:**

The project to achieve 100% compliance to legal and other requirement related to environmental issues.

**B. 3R Effort:**

The project to practice 3R efforts:

- Segregation of construction wastes by types.
- Banning use of polystyrene food packing or wrapping material.
- Recycling of aluminum cans & bottles.
- Recycle & reduced use of paper.
- Save electricity & energy campaign (e.g. Join “*EARTH HOUR 2015*”)
- Save water campaign.

**C. Disposal of Construction Wastes:**

The project to carry out proper disposal of construction waste at designated areas.

**D. Zero Stop Work Order (SWO):**

The project to achieve Zero SWO for environmental matters from DOE or other relevant authorities.

#### **Image (I)**

**A. First 5-S Mixed-development Worksite in Malaysia:**

The project to achieve the “5-S Certification” from ISSO & SIRIM by Sep 2015, to become the first “5-S Mixed-development Worksite in Malaysia”.

## 5. Results of our 5-S Implementation

After 5-S implementation at this site, we have achieved the following Corporate Objective through the 5-S Practice (Leung, Jan 2016):-

<b>Q QUALITY</b>	<b>HS HEALTH &amp; SAFETY</b>	<b>E ENVIRONMENTAL</b>
<ul style="list-style-type: none"> <li>• More Value Add</li> <li>• Better Customer Service</li> <li>• Customer Satisfaction</li> <li>• Lesser Defective Work</li> <li>• Less Rework</li> <li>• Less Repair</li> <li>• Better CONQUAS Score</li> <li>• Better QLASSIC Score</li> <li>• Timely Delivery</li> </ul>	<ul style="list-style-type: none"> <li>• Better OHS Practice</li> <li>• Reduced OHS Risk</li> <li>• Fewer Accidents</li> <li>• Better SHASSIC Score</li> </ul>	<ul style="list-style-type: none"> <li>• More 3R Effort</li> <li>• Environmental Friendly</li> <li>• Energy Efficient</li> <li>• Lesser Pollutants</li> <li>• Lesser Resource Consumption</li> <li>• Soil Conservation</li> <li>• Water Conservation</li> <li>• Forest &amp; Trees</li> <li>• Wild Life</li> <li>• Air &amp; Noise</li> <li>• Carbon Footprint</li> <li>• GBI Score</li> </ul>

<b>PG PEOPLE GROWTH</b>	<b>PS PROBLEM SOLVING</b>	<b>P PRODUCTIVITY</b>	<b>I IMAGE</b>
<ul style="list-style-type: none"> <li>• Leadership</li> <li>• Role Model</li> <li>• Team Building</li> <li>• Relationship</li> <li>• Partnership</li> <li>• Team Learning</li> <li>• Knowledge Sharing</li> <li>• Coaching</li> <li>• Communication</li> <li>• Interaction</li> </ul>	<ul style="list-style-type: none"> <li>• Lesson Learnt</li> <li>• Research</li> <li>• Development</li> <li>• Corrective Action</li> <li>• Preventive Action</li> <li>• Problem Solving</li> <li>• Innovation</li> <li>• Pioneer Effort</li> <li>• Dare Experiment</li> <li>• Go Extra Miles</li> </ul>	<ul style="list-style-type: none"> <li>• Progress</li> <li>• Production</li> <li>• Cycle Time</li> <li>• Yield</li> <li>• Speed</li> <li>• System Building</li> <li>• Process Simplification</li> <li>• Cost Control</li> <li>• Space utilization</li> <li>• Lower Overhead</li> <li>• Inventory Control</li> <li>• House Keeping</li> </ul>	<ul style="list-style-type: none"> <li>• Company Image</li> <li>• Brand Name</li> <li>• Logo</li> <li>• CSR Effort</li> <li>• Reputation</li> <li>• Popularity</li> <li>• Customer Royalty</li> <li>• Repeat Sales</li> <li>• Respect</li> </ul>

## 6. Conclusion

The 5-S practice is a well-recognised methodology used by the Japanese for improving the work environment. It has been re-defined by the author as: Structurise, Systematise, Sanitise, Standardise and Self-discipline during his assignment as the Quality Expert to the Malaysia Government at SIRIM in 1993-4. It was found to be keys to improving safety, hygiene, quality, productivity and image. Since then, the model has been developed successfully throughout the HK construction industry.

This paper details the proprietary 5-S audit methodology and reports on how it has been adopted and adapted to the Hong Kong construction environment through the training programme conducted by the first author. Moreover, through the joint efforts of HK5SA and SIRIM, a case study by the Setiakon Construction company in Malaysia is also revealed with remarkable successes.

The 5-S practice is useful because it helps everyone in the organisation to live a better life. It is the starting point of a TQM programme. In fact, many successful organisations, east or west, have already included some aspects of the 5-S in their routines without being aware of its existence as a formalised technique. It is therefore hoped that this paper will serve as a seed and a working manual to promote such an effective and important quality techniques to the construction industry throughout Malaysia.

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## Author's Background



**Mr. K.T. Leong** is the Project Director of Kerjaya Prospek (M) S/B & Ex-Project Director of **Setikon Builders S/B from 2011-18** where he developed this paper. He earned a BSc in Construction Management and then MBA from Greenwich University in Australia. He has vast experience in construction management and have been instrumental in many mega-projects in Malaysia, including:

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- Berjaya Golf Resort – Bukit Jalil Link 2
- Skyluxe Development – Skyluxe on the Park
- BT Homestead – 28 Dutamas
- Glomac Damansara Block B & C – Mixed Development
- Fitters, Setapak – SOHO Units and Serviced Apartments
- Tropicana Danga Bay – Tropez Residence
- Bellworth, TTDI – The Greens
- OSK, Jalan Yap Kwan Seng – Mirage Residence