Introduction: what is the 5-S?

The 5-S practice is a technique used to establish and maintain a quality environment in an organization. The name stands for five Japanese words: Seiri, Seton, Seiso, Seketsu and Shitsuke [1]. The English equivalents, their meanings and typical examples are shown in Table I.

The technique has been practised in Japan for a long time. Most Japanese 5-S practitioners consider the 5-S useful, not just for improving their physical environment but for improving their thinking processes as well. Apparently, the 5-S can help in all strata of life and many everyday problems could be solved through adopting this practice.

Surprisingly, this powerful quality tool has been a secret to the West. The Western world has just recently recognized the significance of the 5-S practice, although there are indications that some companies have included some aspects of the 5-S in their routines without being aware of its existence as a formalized technique. There are many examples of successful implementation of some principles of the 5-S, especially in service sector organizations, such as fast-food restaurants, supermarkets, hotels, libraries and leisure centres. The difference between the Japanese and Western approach lies mostly in the degree of employee involvement. By formalizing the technique, the Japanese established the framework which enabled them to convey successfully the message across the organization, achieve total participation and systematically implement the practice. The 5-S has become the way of doing businesses, not only to impress the customers but also to establish effective quality processes as prerequisites for good products and services.

The 5-S in detail

The following sections will explain each of the constituents of the 5-S practice and the benefits of its implementation, yet not make it too complicated to understand. While contemplating each of the 5-S aspects, a reference can be made to the 5-S Audit Worksheet developed by Ho [2].

What is organization (Seiri)?

Organization is about separating the things which are necessary for the job from those that are not, and keeping the number of the necessary ones
as low as possible and at a convenient location. In those times when the land was poor and supply of goods was naturally restricted, people would hold on to the least little thing because it seemed such a waste, almost a sin, to throw anything away. Yet today, when there is an abundance of goods, services and information, sorting through these things has almost become an art. It is important to save things, but it is just as important to throw things out. And, most important of all is knowing what to discard, what to save, and how to save things so that they can be accessed later.

Stratification management
The art of organization is in stratification management. Thus, the key to good stratification management is the ability to make decisions about usage frequency and to ensure that things are in their proper places. It is just as important to be able to throw out a broken or defective part as it is to be able to fix it. A summary of organizing things is shown in Table II.

Differentiation between need and want
Once stratification and classification are done, you are in a position to decide what you want to do with things that you do not use more than once a year. Save them or throw them away? If you decide to save them, how much of them do you need to save? It is safe to assume you need less of something, the less frequently you use it; and whenever you do this kind of major house cleaning you will find loads of junk you do not need. This is a never-ending process, not only because things tend to collect, but also because it is very difficult to distinguish between what you do and what you do not need. Many people do confuse need and want. Most of us have a colleague who has collected 60 trade magazines on his shelf over the last five years and claims that he wants to keep all of them for reference. If you ask him “Which of the 60 magazines do you need?”, he would probably scratch his head and say “I do not know what you are talking about”. However, if you formulate your question the following way: “Which of these 60 magazines have you not been touching over the last year?”, you should not be surprised to find that the answer is 50.

Most people tend to err, in the beginning, on the conservative side of saving things “just in case”. But it is crucial that management make a decision. Is it needed? If not, get rid of it. If yes, how much of it is needed? Get rid of the rest. If something is borrowed, return it to its owner.

Table I: The 5-S practice: English equivalents, meanings and examples

<table>
<thead>
<tr>
<th>Japanese</th>
<th>English</th>
<th>Meaning</th>
<th>Typical example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seiri</td>
<td>Structurize</td>
<td>Organization</td>
<td>Throw away rubbish</td>
</tr>
<tr>
<td>Seiton</td>
<td>Systemize</td>
<td>Neatness</td>
<td>30-second retrieval of a document</td>
</tr>
<tr>
<td>Seiso</td>
<td>Sanitize</td>
<td>Cleaning</td>
<td>Individual cleaning responsibility</td>
</tr>
<tr>
<td>Seketsu</td>
<td>Standardize</td>
<td>Standardization</td>
<td>Transparency of storage</td>
</tr>
<tr>
<td>Shitsuke</td>
<td>Self-discipline</td>
<td>Discipline</td>
<td>Do 5-S daily</td>
</tr>
</tbody>
</table>

Table II: The way to organize things according to usage

<table>
<thead>
<tr>
<th>Usage</th>
<th>Degree of need (frequency of use)</th>
<th>Storage method (stratification)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Things you have not used in the past year Things you have only used once in the last 6-12 months</td>
<td>Throw them out Store at a distance</td>
</tr>
<tr>
<td>Average</td>
<td>Things you have only used once in the last 2-6 months Things used more than once a month</td>
<td>Store in central place in the workplace</td>
</tr>
<tr>
<td>High</td>
<td>Things used once a week Things used every day Things used hourly</td>
<td>Store near the work site or carry by the person</td>
</tr>
</tbody>
</table>
One is best
Apart from throwing away rubbish, it is worthwhile to introduce a principle of organization called “one is best”. Examples of application include: one set of tools/stationery, one-page form/memo, one-day processing (Figure 1), one-stop service for customer and one-location file (including local area network server for file sharing). There is a lot of virtue in an ancient Chinese saying, “Let today’s work belong to today,” to support the context of “one-day processing”. It requires a combined effort of organization and self-discipline.

What is neatness (Seiton)?
Neatness is a study of efficiency. It is a question of how quickly you can get the things you need and how quickly you can put them away. Just making an arbitrary decision about where things go is not going to make you any faster. Instead, you have to analyse why getting things out and putting them away takes so long. There is a need for a system that everyone can understand, follow, and maintain. Suggested route to achieving neatness comprises four steps:

Step 1: analyse the status quo
Start by analysing how people get things out and put them away, and why it takes so long. This is especially important in workplaces where a lot of different tools and materials are used, and where time is scarce. Time spent getting things out and putting them away is time lost. For example, if a person gets something out or puts something away 200 times a day and each time takes 30 seconds, you are talking about 100 minutes a day. If the average time could be reduced to 10 seconds, more than an hour could be saved.

Step 2: decide where things belong
The second step is to decide where things belong. The decision process should rely on certain criteria or logical patterns to enable people to remember where things are supposed to be. Thus, selecting the system that is best for you, your employees and the working conditions will take some study.

It often happens that an object can have two names: its real name and what everybody calls it. In such cases, make a decision which one you are going to use and stick to it. It only confuses people to have two names for the same object. On the other hand, during stocktake, you may find out that there are many things that do not have a name. There may be times when two different things have the same name. You should rectify all these problems as soon as possible.

Step 3: decide how things should be put away
The third step is to decide how things should be put away. This is critical to functional storage; for example, files and tools should be put away so that they are easy to find and easy to access. Storage has to be done with retrieval in mind.

In assigning storage space, designate not only the location, but also the shelf. Decide where things should be and make sure that they are there. This is crucial. When the storage location is on the tool and the tool’s name is on the storage location, you know you are doing it right. The following procedures should be adhered to:

1. Everything should have a name.
2. Make sure that there is a place for everything and that everything is in its place; ensure traceability.
3. Ensure quick identification by putting arrows and lamps, and enable easy retrieval of frequent-use items.
4. Provide safe storage; put heavy things on bottom shelves or on dollies.
5. Include height considerations; knee to shoulder height is most convenient.

What is cleaning (Seiso)?
Cleaning should be done by everyone in the organization, from the managing director to the cleaner. This is why, in Japan, they do not need street cleaners in residential areas. Every family is responsible for cleaning the pavement in front of their houses. Therefore, what
they need are rubbish collectors. The Japanese believe that while they physically clean an area, they are cleaning their minds, too. If you have done your annual cleaning at home before the New Year, you would probably have this feeling of freshness.

There are even companies that have taken steps towards putting little gardens in their workplace rest areas, as hygiene has ramifications well beyond the factories and offices to the surrounding environment.

An orderly progression of cleaning in the factory environment by piece of equipment and by location will often identify causes of various problems in the production process, such as:

- Dirty air-conditioning filters lead to defects in printing.
- Filings in the conveyance chutes lead to scratching.
- Scraps in the die leading to faulty pressings.
- Items fall off the equipment and get into the products.
- Articles get dented or bent in conveyance.
- Filings and other particles contaminate the resin.
- Dirty coolant leads to clogging.
- Dust and other substances ruin the painting process.
- Bad connections are made because the electrical contacts are dirty.
- Fires are caused because garbage short-circuit the electrical equipment.
- The computer always plays up because dirt is accumulated inside.

In an office or a factory, you might start by graphing out the individual areas of responsibility. In doing this, it is important that all assignments be absolutely clear and that there are no undefined, unallocated or grey areas. Unless each and every person takes these admonitions to heart and accepts personal responsibility, you are not going to get anywhere.

**What is Standardization (Seiketsu)?**

Standardization means continually and repeatedly maintaining your organization, neatness and cleaning. As such, it embraces both personal cleanliness and the cleanliness of the environment. The emphasis here is on visual management and 5-S standardization. Innovation and total visual management are used to attain and maintain standardized conditions so that you can always act quickly.

**Visual management**

Visual management has recently come into the limelight as an effective means of continuous improvement. The objective is to use visual aids (colourful notice boards, attractive slogans, indication lights) to make communication simple and effective. It has been used for production, quality, safety and customer services. Colour management has also come in for considerable attention lately. This has been used not only for colour-coding, but also to create a more pleasant work environment. More and more workers are opting for white and other light-coloured clothes; because these clothes show the dirt quickly, they provide a good indicator of how clean the workplace is. They highlight the need for cleaning.

One effective method of visual management is putting up appropriate labels, such as lubricating oil label, annual inspection label, temperature label, responsibility label, safety label and OK mark.

**Transparency**

Another important consideration for standardization is “transparency”. In most factories and offices, tools and files are put in lockers, on closed shelves, and under covers to be out of sight. Just like sweeping things under the carpet, this is known as “out of sight, out of mind”. Those closed spaces are often among the most disorderly places, because they are not a constant eyesore. So it will be a good idea to take the wraps off these messes. Make the covers transparent. If you must have metal panels, put inspection windows in them. Make it so that everybody can see what is stored and how good (or bad) things look.

**Trouble maps**

When there are problems, you can show them on a map of the workplace. Just as many sales departments have pins in maps to show where their people are, you can also have pins to show problems, emergency exits, fire-fighting equipment, and other important locations. Put the maps where they are visible to everyone. A trouble map can also be used to indicate those workplaces and processes that are trouble-free.

**Quantification**

By constantly measuring things, quantifying the results, and analysing the data statistically, you can quickly identify the limits to manage-
ment and spot deviations before they become major headaches.

What is discipline (Shitsuke)?
Discipline means instilling the ability to do things the way they are supposed to be done. The emphasis here is on creating a workplace with good habits. By teaching everyone what needs to be done, and having everyone practice it, bad habits will be broken and replaced by good ones. This process helps people form habits of making and following the rules.

Self-discipline is important because it reaches beyond discipline (Figure 2). If a person is “disciplined” to do something at one time, there is a chance that he or she may not be disciplined next time. However, self-discipline guarantees the continuity of a daily routine. The Japanese are a very self-disciplined race: they have one of the lowest crime rates in the world and are well-known as “obedient” tourists.

Discipline is a process of repetition and practice. Think of discipline as an integral part of industrial safety. How many people have had accidents because they forgot to wear their safety helmet, their safety shoes, or their goggles? Far too many. How many have had accidents because they stuck their hands into the machinery without shutting it off first? Again, too many. It is important that everyone has the habit of obeying simple safety rules.

MacGregor[3] identified two sides to the human attitude 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. Ouchi[4] observed many successful Japanese and American firms and found out that people actually consider the organization as part of their family. The staff in these companies devote much energy and time to their work as if it were 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.

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

Why is the 5-S practice useful?
There are many things that people do automatically without thinking. Sometimes, we are aware of bad performance in our workplace but deliberately avert our eyes from the facts, feeling helpless. The 5-S can help in most things we do. Listed below are some features of a neglected working environment:
• Bad interpersonal relations.
• People look worn-out.
• High absenteeism.
• Workers do not care about their work.
• Workers do not make suggestions on how to improve the work process.
• QCC activities are stalemated.
• The workplace is beset with defectives and reworking.

First, the 5-S practice is useful because it will help everyone in the organization to live a better life. If you implement the 5-S at your home first, you will see the real benefit. Once you gain experience and become aware of the usefulness of the 5-S, you can start implementing it at your workplace. In turn, you will benefit from the improvement in your workplace environment.

The 5-S can form a good basis for quality circle activities. Many times circle members come together with a lack of agenda for discussion. The 5-S practice can provide a very good framework for improvement, since it tackles the root of the problem through...
aspects of work organization, neatness, cleaning, standardization, and self-discipline.

The 5-S also forms a basis for other quality improvement activities. For example, to implement ISO 9000, many consultants would advise their clients to hire a lorry before the compliance audit – to carry away the rubbish. Obsolete documents and materials would always invite query from the auditors. Moreover, seeing is believing. If the firm being audited can project a neat and clean image to the auditors, there is little reason for them to doubt the effectiveness of the implementation of the ISO 9000 quality management system.

Practising the 5-S activities results in immense benefits to the company. A 5-S workplace is high in quality and productivity, keeps cost down, ensures delivery on time, is safe for people to work, and is high in morale. As Dr Deming has pointed out: management should try to develop an environment in which the workers enjoy their work and take pride in it. What is this environment, then? It is simply the 5-S environment! That is why Y. Kondo (1971 Deming award winner) said, “In Japan, top executives have cited the 5-S as their number one management priority”.

The specific purposes of the 5-S practice can be related to the various aspects of any working environment, such as safety, quality and breakdowns.

How to implement the 5-S

The 5-S implementation requires commitment from both top management and everyone else in the organization (Figure 3). It is also important to have a 5-S champion to lead the whole organization towards the 5-S implementation step by step. If you decide to be the 5-S champion of your organization, the following steps will help you to achieve success.

**Step 1: Get top management commitment and be prepared**

You have to sell the idea of the 5-S to the most senior executive of your organization. Moreover, and like any other quality programme, it is no good to get just lip-service. He or she needs to be 100 per cent committed; not just in announcing the start of the 5-S practice in the promotional campaign, but also in being committed to give resources for training and improvements. Then you need to get prepared yourself.

In promoting the 5-S activities, the important thing is to do them one at a time and to do each thoroughly. Even the little things have to be taken seriously if they are to make any meaningful impact. This process can be stratified as follows:

1. Make a decision and implement it (e.g. the decision to get rid of everything you do not need, the decision to have a major house cleaning, and the decision to have five-minute clean-up periods).
2. Make tools and use them (e.g. special shelves and stands for things, instructional labels, and placement figures).
3. Do things that demand improvements as prerequisites (e.g. covers to prevent filings from scattering and measures to prevent leakage).
4. Do things that require help from other departments (e.g. fixing defective machinery, changing the layout, and preventing oil leakage).

**Step 2: Draw up a promotional campaign**

The first thing to do for a promotion campaign is to set up a timetable. In general, the plan should be of six-month duration and can be broken down into ten key activities:

1. Get top-management commitment, assess status quo and establish implementation plan.
2. Organize a 5-S workshop for 5-S facilitators.
3. First 5-S day – Organization (e.g. throw away things you do not need).
4. Second 5-S day – Neatness (e.g. name everything and assign locations).
5. Third 5-S day – Cleaning (e.g. altogether house cleaning).
(6) Fourth 5-S day - Standardization (visual management and transparency for things).
(7) Fifth 5-S day – Discipline (e.g. do your own 5-S audit).
(8) Daily 5-S activities by everyone.
(9) Grand prize presentation for the best 5-S department/section.
(10) Review and plan for next 5-S campaign.

A week before the Day, posters should be put up to explain briefly the focus and activities of the Day and to give some simple examples. As for motivation, it is usually necessary to give prizes (gold, silver and bronze) to the top three 5-S winning teams of the day. The judging panel should include the 5-S champion and all the 5-S facilitators. The prizes should be presented by the CEO at the end of the day.

Step 3: Keeping records
It is important to keep records not only of decisions made but also of the problems encountered, actions taken and results achieved. Only if past practice has been recorded will people have a sense of progress and improvement over time.

Photographs
Photographs are one excellent way of keeping records. There should be both full-view pictures of the workplace and close-up pictures of specific parts and places indicating all the important phases of the 5-S implementation. These photographs provide points of reference not only for the people involved, but for outside experts as well. They can also be used to publicize the progress at company-wide 5-S meetings.

Videos
Nowadays video is used as a powerful tool to explain problems and convince an audience. Some companies find it rather encouraging and beneficial to record on a videotape the situation before and during the 5-S Day to illustrate the difference before and after the improvement. It will make a scene if used in the feedback presentation at the end of the Day. Experience proves that video recording and presentation adds much fun to the 5-S Day.

The “P” mark
Use a bright red or yellow “P” to indicate problem places and places that need attention. You might even have special days when this is done or special teams to do it, and the Ps should serve as vivid reminders of how much remains to be done. Conversely, a workplace with no Ps is either a workplace that has not been checked yet or a workplace that has already done as much as could be done – and the difference will be immediately obvious to any observer.

Quantification
It is very important that you find ways to quantify what you are doing and the progress that you have made. This can be as simple as before-and-after comparisons to measure the amount of oil no longer lost to leakage or the amount of filings no longer being swept up. Use your imagination and be creative here in how you want to quantify these things to make the results more understandable. Apart from giving you a better insight into what is being done, numbers have a persuasiveness of their own that can be used to convince the sceptics.

Step 4: 5-S training
The 5-S activities are all directed at eliminating waste and effecting continuous improvement in the workplace. Right from the beginning, there will seem to be many 5-S activities to be done. As you go on, you will notice that there are always additional 5-S problems to solve. They are not insurmountable, though, if considered and solved one at a time.

It is essential, in the 5-S activities, that you train people to be able to devise and implement their own solutions. Progress that is not self-sustaining – progress that always has to rely on outside help – is not real progress. It is important that your people know, for example, how to use the computer to do charts and graphs, even if it is not part of their job description. They need to study maintenance techniques. And, oddly enough, the more problems they are capable of solving, the more problems they will spot.

Training should also include section-wide or company-wide meetings where people can announce their results. Not only does this provide incentive, but the exchange of ideas and information is often just what you need to keep everybody fresh.

Step 5: Evaluation
As with so many other things, it is very easy to get into a routine with the 5-S activities – particularly because they demand constant everyday attention to routine details. At the
same time, because the individual tasks appear minor even though they have great cumulative impact, it is easy to think that you can put them off. Everybody is busy, and it is difficult to make alert 5-S activities a part of the daily routine. Workplace evaluations and other means are needed to keep everyone abreast of what is happening and to spot problems before they develop into major complications. In essence, you need to devise ways that will get everybody competing in a friendly but no less intense manner. Your evaluation tools are the key and it is as simple as using the 5-S audit worksheet as your evaluation criteria. The objective of the evaluation is to ensure that the 5-S implementation leads to a conducive total quality environment.

Two 5-S case studies

The implementation of the 5-S practice implies acceptance of new daily routines, and introduction of new behavioural patterns that will enhance not only the physical efficiency of the working place, but also motivation, job satisfaction and creativity of the employees. Experience shows that this process is simple and straightforward and it does not cost a lot. Two case studies are discussed below to illustrate the process and benefits of implementation. The SIRIM case is to demonstrate how the 5-S was successfully implemented in a large organization which consequently became a benchmark for others to follow. The Wellex example shows the big change in a small business culture that resulted from the implementation of this strategy.

Implementing 5-S at the Standards and Industrial Research Institute of Malaysia (SIRIM)

This case study resulted from the authors’ experience in Malaysia. The SIRIM is the government organization responsible for industrialization programmes in the Malaysian economy. It is one of the largest institutions of this kind in the world, encompassing the functions of national standardization, technology transfer and quality and productivity improvement consultancy. Apart from the head-office in Shah Alam, SIRIM has seven branch offices throughout the country. At its head-office, there are over 30 blocks of buildings with nearly a thousand employees.

SIRIM has decided to implement 5-S itself. This was necessary as SIRIM saw its benefits and also wanted to set an example for industries. The director general of SIRIM announced a Saturday as the SIRIM 5-S Day. Before that day, some live videos were taken of the 5-S audits conducted at the SIRIM headquarters.

On the 5-S Day, the director general took the lead and put on his sportswear. A 40-minute seminar about the 5-S implementation was held for some 80 senior staff, including the 20-minute 5-S audit video presentation. At the same time, all remaining 900 staff were given a one-page guideline to “throw away the rubbish and do all-together cleaning”. At 1 pm, when the 5-S Day was over, three lorry-loads of rubbish were thrown out of the 30 blocks of buildings. More interesting was that a week after the 5-S Day, more rubbish came out of the buildings including steel filing cabinets which were not suitable for the “transparency” requirement of the 5-S.

Since the 5-S Day, many individual sections have requested in-depth workshops on each aspect of the 5-S practice. A group of facilitators which has been actively carrying out the 5-S activities underwent a thorough training. There are continuous requests from industries for consultancy service from the SIRIM’s Industrial Extension Unit regarding implementation of the 5-S. As a result of the high demand for 5-S consultancy service, the Unit has been allocated additional human resources to satisfy this need.

Implementing the 5-S at the Wellex Corporation in the USA

Wellex Corporation[5] was established in 1986 by three Taiwanese immigrants in the USA. By 1990, Wellex was an award-winning printed circuit-board contractor with an annual turnover of US$13.5 million and had built a good reputation among clients such as IBM, Sun Microsystems and Silicon Graphics. As the business grew, the company employed 300 people from over 30 different countries.

In 1991, the demand for high-tech hardware plummeted. At that time, the only way to survive was to cut costs. Nevertheless, Wellex decided not to reduce staff, since management treated the employees as their biggest asset. In the attempt to cut costs, they turned to the Japanese experience.

In August 1991, the managing director and five managers visited Miyoshi Electronic, a
Japanese company engaged in a similar business. There they were astonished by the cleanliness and neatness of the factory floor and the impact of overall organization on employees' performance. The secret was in the 5-S system, the principles of which are basic for further quality improvement. The workers understood the importance of instilling the 5-S in their personal lives as well. It all contributed to improvement of interpersonal relationships across the company.

The team from Wellex was impressed and decided to launch the same practice back in their own company. Although there was a certain amount of scepticism towards the 5-S, a typical reaction of an individualistic culture, the results were encouraging. One of the assembly-line workers explained the impact of the 5-S implementation thus: “Before, I'd have to wait around for my supervisor to tell me what to do. Now, I know what to do when I arrive in the morning. I have a schedule, and I keep records of all my work. This is a good system. Everybody knows what the problems are and how to fix them.” They all emphasized the importance of organization, cleanliness and discipline for a good atmosphere and mutual support in the factory. The 5-S system set different sets of rules from the previous practice but it made people more of a team. As another worker stated, “Before the 5-S, we just worked. Now, I try to improve my work.”

Just two years after the 5-S came to Wellex, productivity has skyrocketed by over 26 per cent, with turnover exceeding US$23 million. This result suggests that the 5-S culture is universal and can be related to any working environment if there is a commitment to the common objective.

Conclusion

The 5-S practice is a well-recognized Japanese method for work improvement. It consists of five principles: organization, neatness, cleaning, standardization and discipline that represent the key to a total quality environment. His article introduced the 5-S methodology in detail to help management understand that these principles are fundamental steps for TQM. The five stages of the 5-S implementation are: top management commitment, a promotional campaign, keeping records, 5-S training and evaluation of the results. The two case studies are used to illustrate the process and benefits of 5-S implementation. The SIRIM case demonstrates how the 5-S was successfully implemented in a large organization which consequently became a benchmark for others to follow. The Wellex example proves that the 5-S culture is universal and can be related to any working environment if there is a commitment to the common objective.

References