

Introduction to Lean Construction
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Module1 - Lecture 49
Understand the Applications of 5S through Case Studies_3 cases

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Need for the Study

- When one develops 5S thinking, one makes a *commitment* that the place one works in is *well-maintained and organized* and through that the organization will get benefits and better results, and so on.

Objectives

- It helps to *identify and eliminate waste*
- To maintain *well-organized workspaces*



Another case study we had from Shapoorji and Pallonji. This was in Amravati in Andhra Pradesh, by GO Housing Project. So, there again they wanted to start doing 5S and they made a commitment that they will keep the worksite well organized and will maintained. So, their main objective was to identify and eliminate waste and create well organized workspaces.

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Methodology



- APGC GO Housing project implemented 5S in Group D and Type II buildings
- Several *training sessions* were conducted to Frontline Engineers and Workers describing the importance of 5S
- The site conducted several 5S *audits* at an interval of 10 days between the audits
- A "*Red tag area*" was identified in the site where each labor would place one unwanted material from their workplace. From that pile, items which can be *reused* are identified and the remaining items are *disposed off*
- The tools and the various materials are properly *sorted* out, kept in correct places, properly cleaned regularly
- The processes are *communicated* to all at the site and steps taken to *ensure sustained practices*

Training to Frontline Engineers



5S Training to Workers



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So, the methodology adopted there was, they had several training sessions for staff and labor and then they had done the 5S audits in an interval of 10 days, starting with the red tag and so on. Here you can see the picture of the workmen being given a training session. Normally, you can combine this with the toolbox talks and so on. And all the equipment, tools they were all properly kept sorted out and the process was communicated to the labour and staff again and again in a number of different ways. So, that the picture, the message went in very strongly and they were all following it voluntarily.

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Glimpses of 5S in Action



- It became very *easy to find items* such as fittings, fixtures, tools, tackles, etc.
- *Housekeeping* in Group D buildings seems to be good and improving after implementation
- *Red tag area* was developed in site, used to identify the materials which can be *reused* and reduces the cost



Site Pictures



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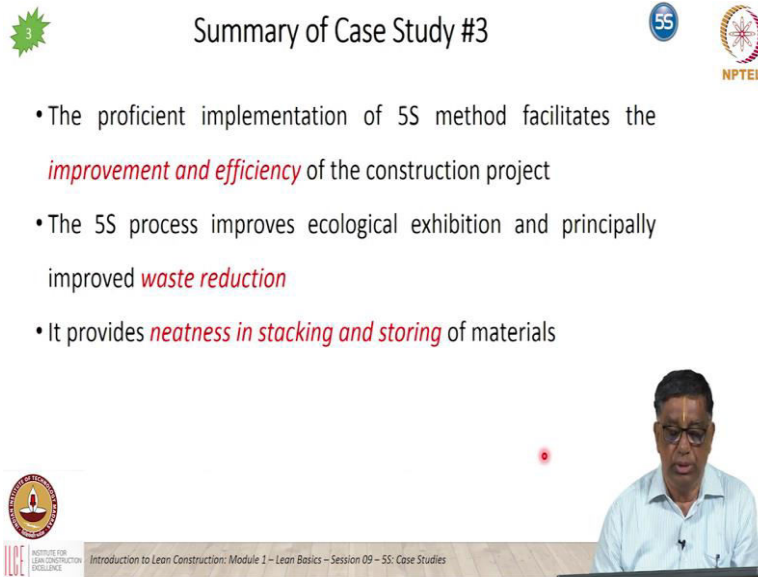
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Once they were practicing 5S, they found it was quite easy to find items, such as fittings and tools and tackles and so on, which they were finding it quite difficult to locate before starting 5S. The housekeeping became very nice, they were able to get better productivity

and the red tag area, they were able to recover materials. For example, some plywood which earlier on would have gone completely in the scrap that was became recoverable and unwanted plastic and so on used to go into waste. So, you have a clear-cut sorting into useful items and not so useful items.


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Summary of Case Study #3

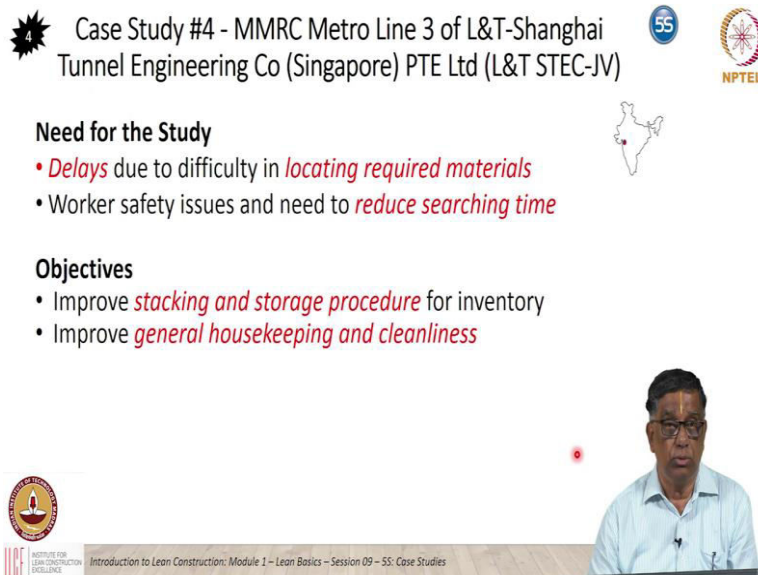
- The proficient implementation of 5S method facilitates the *improvement and efficiency* of the construction project
- The 5S process improves ecological exhibition and principally improved *waste reduction*
- It provides *neatness in stacking and storing* of materials



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So, the summary of the study was, considerable improvement in efficiency of the constructional aspects, waste reduction, by being able to recover usable items from scrap and then the whole area was became quite neat by well stacked materials. So, there are a number of different advantages, which different people are able to find by doing 5S. So, this site had definitely found good value by doing 5S.

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Case Study #4 - MMRC Metro Line 3 of L&T-Shanghai Tunnel Engineering Co (Singapore) PTE Ltd (L&T STEC-JV)

Need for the Study

- *Delays* due to difficulty in *locating required materials*
- Worker safety issues and need to *reduce searching time*

Objectives

- Improve *stacking and storage procedure* for inventory
- Improve *general housekeeping and cleanliness*




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The next case study we have from L&T JV with Singapore company for doing underground metro work, this was right in the middle of Bombay, in Mumbai is near Sakinaka near the airport. I had been to the site, very highly congested, very limited workspace, and they had to do 5S to organize the site quite well to generate working space.

So, they had a lot of delays earlier in locating materials, because limited workspace. Something had to come from a bigger storage yard kept away from the site. So, all that could be properly streamlined and the searching time, that got reduced substantially and they also generated procedures for how to stack materials and how to keep it with proper housecleaning and good cleanliness. Being in the middle of Mumbai there, a lot of traffic all around, lot of dust and dirt generated, but in spite of all that, they could keep the place neat and clean and well shined. And by using 5S.


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Methodology


- **Steel Rebars** have been grouped together with *same size* being bundled in a steel yard. The bundles are tagged indicating size and properties displayed in a clear and easy to identify fashion, with bars for each grid being *color coded* for easy visual identification
- Several areas have been *designated for storage of material* in a neat and orderly fashion so as to improve *ease of access* and overall aesthetic maintenance of storage and stacking areas which in turn leads to *minimization of waste* in time in *locating materials* and ensuring more time is hence spent in value added work
- **Machinery** is regularly *inspected and cleaned* in accordance with standards
- **Inventory** is checked to see if any parts are present which are not required
- **Safety Equipment** is checked in order to make sure they are in place and up to date
- Information for *daily routine* is made clear and available




5s Audit Check Sheet For Store



5s poster on Site





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One very good thing I liked in that site was using signboards with local language, this you see a board here with Hindi and Marathi, it says kriya vidhi aur arth that means the process at the meanings, the local workmen, they need to understand what you mean by sort, set in order, shine and so on. So, the local language explanations were a great help and the labor came on board much more easily to understand and follow the processes, the 5S processes.

One example was they had the rebars which were stacked separately and they were used colour coding for the various diameters. So, immediately you could make out which diameter bar was stored where and by properly moving materials to the worksite at the right time, using a Kanban process, they could save time, and save space also.

And waste was well minimized by using the materials properly by stacking them, by identifying the right materials. Many times, when you are not able to find the right material or item in the hurry of doing things, you use the wrong one and consequently you get some waste, but if you know exactly where it is stored, and you are able to access the right item, then waste can be minimized.

So, they had gained good benefits by doing that, and all the machinery were will maintained, well inspected and they could pride that they were an L&T company and all the items are being stored and kept in good working order. And they also could get easy check on inventory in stores, where they had a big signboard in the stores, which showed exactly what items were kept, how much stock all that. So, checking the safety equipment or having daily routines, there were also many other examples.

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Glimpses of 5S in Action

- Overall *reduction in search time* for materials, *reducing wastes*
- Improved *housekeeping* aspect
- Efficient *space utilization* and reduction of clutter
- Reduced *searching time* of materials

STACKING



Rebar Yard

BEFORE



AFTER



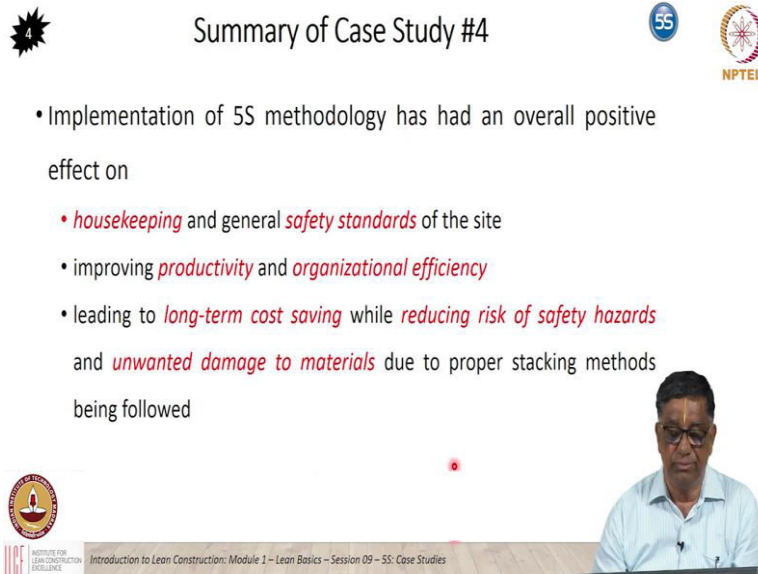




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So, the main advantages which they gained were, reduction in storage time, much better housekeeping, even though they were working in a very congested place, better utilization of space and reduce search time for materials, equipment and so on. So, even the passers-by, who used to pass by, they used to admire the way they were keeping the materials and equipment.

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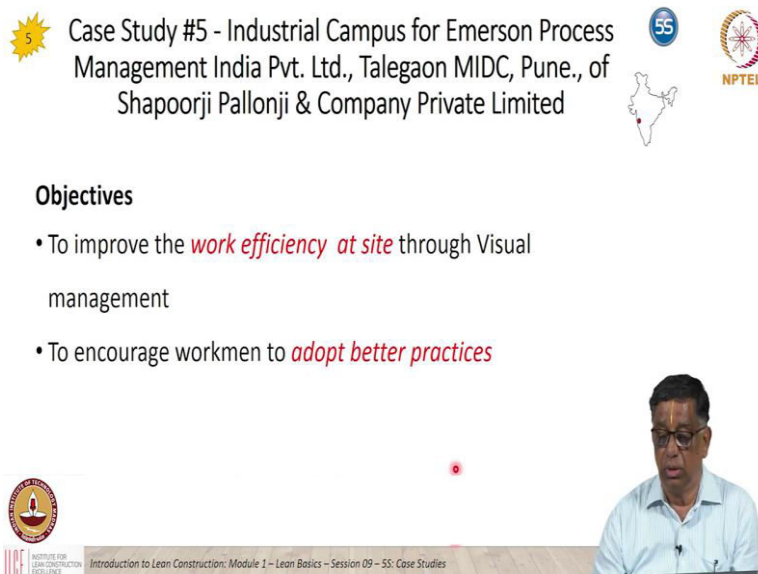
4 Summary of Case Study #4

- Implementation of 5S methodology has had an overall positive effect on
 - *housekeeping* and general *safety standards* of the site
 - improving *productivity* and *organizational efficiency*
 - leading to *long-term cost saving* while *reducing risk of safety hazards* and *unwanted damage to materials* due to proper stacking methods being followed

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So, good housekeeping and safety standards, improve productivity by better organizational efficiency and long-term cost savings, because they could recover a lot of items from the scrap, which they were finding in the red tag area. And many times, when you do not store properly, the materials and tools they get damaged. So, they found that the unwanted damage was coming to be much, much less than what they had earlier. So, very tangible, discernible savings and advantages by practicing 5S in this site.

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5 Case Study #5 - Industrial Campus for Emerson Process Management India Pvt. Ltd., Talegaon MIDC, Pune., of Shapoorji Pallonji & Company Private Limited

Objectives

- To improve the *work efficiency at site* through Visual management
- To encourage workmen to *adopt better practices*

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The last case study we have was in a place in Pune a place for Emerson, Process Management India by Shapoorji Pallonji. So, here again, they wanted to improve the work efficiency and get the workmen to adopt better work practices.

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Methodology

- *Posters at project entrance* and various internal locations proclaiming and prompting 5S adoption
- Placing *Waste Bins near the exit gate* for workmen's use, with pictures to identify & segregate wastes by themselves
- *Training workmen to collect waste materials* while going for Lunch/ Shift end & dispose of in specified bins at exit from site. Done through Induction training, Daily Toolbox Talks and monthly HSE events



Poster at Project Entrance



Waste Bins near the Exit gate



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So, here they had an excellent idea, whenever the labour was leaving, at the end of a shift or for lunch, they had to carry one unwanted item and when they exited the site, at the place where they go and punch their cards, there are different bins, colour coded bins kept there. So, the scrap which is unwanted scrap, recoverable scrap, useless scrap, plastic, steel. So, they had different bins like that with different colour codes, and the labor used to put the items in the right place.



So, much so, that the labor started get taking pride, if they found one of their people going out without carrying something, they used to pounce upon him, that is your material. So, they go back, because some scrap and come back with that. So, nobody would leave the site for lunch or shift ending, unless they carried something, they put it in the right place.

And here again, they had signboards in the local language, which the labor could understand easily empathize with that and adopt that. So, very good practice. And there waste minimization, waste recovery was again a very high order.

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Methodology





- **Placing 5S posters** at locations with high visibility, and **floor plans**
- Conducting **Regular 5S Audits** & discussing the rating & observations in Big Room Meetings
- Maintaining a **clean office area** to improve work atmosphere and encourage workmen to follow the same at their workplaces
- Creating a **Red Tag Area** close to buildings where work is prioritized


Regular 5S Audits


S No	Date	Location	Type	Auditor	Sort	Set in order	Shine	Standardize	Sustain	Total
1	04-04-19	Main Sub-Station	Site	Sudheer	72%	80%	80%	88%	88%	80%
2	04-04-19	Canteen building	Site	Sudheer	70%	80%	80%	57%	70%	67%
3	04-04-19	Main Office	Office	Sudheer	90%	90%	70%	80%	70%	80%
4	05-04-19	Admin Phase-2	Site	Shahk Abul	50%	60%	60%	40%	40%	50%
Project Average:					68%	70%	70%	47%	53%	60%


Red Tag Area



Placing Floor Plans










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And they used to conduct frequent audits. And I found that some places, they even had scores above 70, that indicated a keen desire for doing 5S voluntarily with self-discipline. And they had regular audits. And even the office areas, I had been there, they are very, very clean, well maintained, and the red tag area was well identified, and people used to know that. And good display of various kinds of charts and route locations and so on.


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Summary of Case Study #5

- **Minor repairs for Formwork material** are done at Red Tag Areas to save time in movement
- Improved **overall cleanliness** at site and efficiency
- Workmen carry some **waste** or debris out from workplace everyday by own volition, and additional efforts for waste removal is avoided
- Continued 5S implementation improves **workmen culture** & overall cleanliness at construction sites





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So, it was a very well and good usage of visual practices, having charts, having colour coding, having messages for the local people in the local language and the many materials they could actually repair and reuse particularly formwork materials, and the overall cleanliness became much, much better with the practice of 5S.

And the workmen culture, the morale of the workmen started improving by this kind of practices. They used to take pride in bringing the waste material out from the site, and also keeping things neat and clean. So that is again, something which is good for the labor. And once our morale improves, the productivity improves, quality improves, and safety also improves. So, that is a very good example we had the Pune site.

So, I hope you all had a good glimpse of 5S, the basic definitions, the methodologies of practice. And then finally, we had a number of case studies where you could see how people were starting 5S, how implementing 5S, and how they used to reap substantial benefits by practicing 5S. So, I hope you will all learn to do the same in your own project sites, and also in your own homes by yourself. All the best. Thank you.

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Quiz



1. Identify the *incorrect* features of 5S implementation in Khalapur site from the following:
 - a) Adoption of Spider diagram to show results of 5S audits for all the 5S's
 - b) Consistently increasing Audit scores for all the 5S's
 - c) Frequent internal trainings and Audits were adopted
 - d) All of the above

(b) Consistently increasing Audit scores for all the 5S's
2. Right / Wrong?: At Barrackpore site Sorting and Tagging were main issues followed for 5S.

Right
3. Right / Wrong?: At APGC site a main issue was Neatness in Stacking and Storing in 5S implementation.

Right
4. Right / Wrong?: In MMRC site 5S benefits included increase in Safety and reduced unwanted damage to materials.

Right
- Right / Wrong?: In Emerson site Workmen used to carry out a piece of waste while going out for lunch.

Right



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Supplementary Module

Link (to read and contribute)
<https://tinyurl.com/yemou3g5>









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