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Eliminating Treasure Hunts
Applying the 5S’s for Lean Construction

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5S's Presentation

Objective:

At end of session - Understand:

- Know how the 5S’s help eliminate treasure hunts on job sites
- Understand the meaning and intent of the 5S’s
- Know how to apply the 5S’s to construction work having seen many examples
- Understand how to use Kanban techniques to manage consumables
- Know how to start a 5S effort
Remember the Goal:

TO: Contractor - AKA YOU

FROM: YOUR BEST CUSTOMER

If you keep doing what you are doing, we have no choice but to keep buying from you.
There is more to Lean Construction than the Last Planner System ®

- 5S’s
- A3
- Kaizen
- **Kanban**
- Muda Walk - “Chalk Watch”
- Poka-Yoke
- Process Mapping/Value Analysis
- Quick set up/change
- Rules of Release
- Spaghetti Chart
- Target Value Design
- Visual Controls
Lean is all about Respect for People
FMI 2012 Productivity Report

- 72% said they know about Lean
- 44% have used Lean
- 27% reported a lack of clarity around what Lean management practices are or how they apply to the construction industry
- 76% who have used Lean report some productivity gains
- 14% reporting significant productivity gains
Pathway to Lean

The 5S's

The Value Stream
Flow
Pull

Continuous Improvement

Value Vs Waste

5S's

Last Planner

Modularization
The 5S’s

VALUE

Transforms product/service to what the CUSTOMER is actually willing to PAY for (USEFULNESS/COST)

Includes Functions, Features, Time & Price

Is done right the first time.

Relates to the whole product or service received

Is the opposite of WASTE.
7 Basic Types of Waste (Muda)

- **Defects in products:** Rework, Errors & Punch Lists
- **Overproduction:** Fabricating material or ordering it too soon, JIC thinking. Ordering extra material because of poor quality or fit
- **Inventory:** Material stored at site or yard, work in process, unused tools & parts, forms and stashes *(Strategic vs Excess?)*
- **Unnecessary processing:** Double & triple estimates from suppliers, redundant or unnecessary reporting, multi signatures on forms, material requisitions or time sheets, any non-value added steps
- **Unnecessary movement of people:** Treasure hunts, looking for files, drawings and poor layout of work area (ergonomics) Movement Not = WORK!
- **Transport of goods:** moving material, tools or parts, handing off work between crews
- **Waiting:** Crews waiting for equipment, plans, RFI's, field orders, or material, payroll waiting for time sheets, equipment waiting to fabricate material
Lean is all about Respect for People

The 8th Waste - not using the minds of the employees.
What are the 5S's?

**ARE**
- Part of Lean Thinking - Value vs. Waste
- Simple and Practical
- Reduce Treasure Hunts
- Investment (with a payback)
- A good fit with Craft
- To help Flow the work

**ARE NOT**
- Mandatory
- A Spectator Sport
- Carrot or stick
- One time "thing"
- Free - takes effort
- Limited to Craft
- Just about being neat & clean
The 5 S's

- Sorting
- Simplifying (Set in Order)
- Sweeping
- Standardizing
- Self-discipline (Sustain)
The 5 S's

SORTING

Sort out the **necessary** from the **unnecessary**, discard the unnecessary.

*When in doubt - move it out!*
Sorting Steps:

1. Red-tag items - meaning mark all items to be considered as unnecessary.

Where to look?

- At materials or parts stacked around the site/shop
- Excess parts or inventory
- Under work areas, desks, cabinets, in corners, on storage shelves, around the trailers
- In boxes that are not labeled
- Near the bottom of tall stacks of items
Sorting Steps:

Where to look?

- Tools or parts locked away in lockers or cabinets
- Rusted, broken or age deteriorated items
- Tools, parts or material that has dust or oil accumulation
- Outdated posters, slogan signs, notices, and memos
- Disorganized paper piles on desktops
The 5S’s

**Sorting Steps:**

2. Review all items and sort them into groups:
   - Using or will be used
   - Not using, will **not** be used or not likely to be used
   
   **Tip:** Hold a ”USE” auction

3. Get rid of all items that are not or are not likely to be used, inventory those that are or will be using.

When in doubt - move it out!
4. Sort those that you are using or are likely to be used into 3 groups:

- Rarely used (1 - 2 times per year)
- Occasionally used (1 - 2 per month)
- Frequently used items (daily or weekly use)
How to Sort?

- **NECESSARY ITEMS USED OR LIKELY TO BE USED**
  - Red Tag
  - Use
  - Auction

- **UNNECESSARY ITEMS (NOT USED OR NOT LIKELY TO BE USED)**
  - No Value & Easy to Dispose Of
  - Dispose of Immediately

- **SOME VALUE**
  - Look for best user to give or sell

- **NO VALUE BUT COSTLY TO DISPOSE**
  - Find least costly way to dispose

- FREQUENTLY USED (daily or weekly use)
- OCCASIONALLY USED (1 - 2 per month)
- RARELY USED (1 - 2 times per year)

*When in doubt - move it out!*
Some areas where Sorting can be done:
The 5S's

Opportunities to Sort
Opportunities to Sort
Opportunities to Sort
The 5S's

Opportunities to Sort
Opportunities to Sort
Opportunities to Sort
The 5S’s

Opportunities to Sort
Opportunities to Sort
What do you see?
The 5S's

What do you see?
What do you see?
Before 5S's
The Yard
Sorting Practice
SIMPLIFYING
Create and identify a place for everything to maximize effectiveness and safety
Simplifying is creating a designated and marked place for everything according to frequency of use. The goal is achieved when:

1) Items used most often are within easy access thus reducing the time to find something to almost zero.

2) Anyone, even someone who doesn't work in the area, could put everything back to where it belongs by the ways things are marked. Make it obvious where things belong!
Simplifying Steps:

1. Review all frequently used items put those used most often closest to the work area, those used less often, further away. Put tools and parts in sequence used. *Strike zone & 45° rules = POU*

2. Develop a way to label or show where everything goes. Consider:
   - Shadow board
   - Marking the item and the location
   - Color-code
   - Labels on drawers with list of contents
Simplifying Steps:

3. Develop ways to daily replace usable items
   ✓ Establish lead times for replacement of daily usage supplies
   ✓ Determine minimum & maximum supply levels and mark it.
Examples of Simplifying
The 5S’s

Examples of Simplifying
The 5S's

The Yard simplified
Quality Support Services, Inc.

Horizontal and Vertical Racks
The 5S's
The 5S's
The 5S's
The 5S's
The 5S’s

Labeling

Quality Support Services, Inc.
Simplifying the Inside a Service truck
Example of Simplifying
Example of Simplifying
Example of Simplifying
The 5S's
Kanban Example
Plans stored in a trailer

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.
Simplifying Desk Files
How could Sammy Sosa and the Cubs have benefited from the 5S’s?
SWEEPING
Physical and visual control of the work area
Sweeping

Sweeping is done when regular sweeping processes occur and areas are clean, safe and neat.

Actions:
- Determine regular schedule for cleaning the yard, work & break areas.
- Orient everyone including new employees with daily 5S’s activity responsibilities and expectations.
- Post area cleaning guidelines and schedules.
Sweeping

Actions:

• Keep tools, machinery and office equipment clean and in good repair.
• Keep yard, work/break areas and trailers clean and orderly.
• Establish a dependable, documented method in place to reduce hazardous waste and minimize chemical products usage.
• Perform safety inspections on a regular schedule.
• Prevent dirt in the first place or at least contain it.
• Have the right tools & supplies ready.
• Make sure supplies are easy to find and put away.
Part of the Sweeping is preventing things from getting dirty!
The true value of Sweeping:

- Cleaning is inspection - *is it ready for future use?*
- Identifies problems you aren’t aware of
- Helps prevent future failures
- Helps avoid treasure hunts
- Promotes good maintenance practices
Sweeping Opportunity
Sweeping Opportunity
STANDARDIZING

is creating standard ways to keep the work areas organized, clean and orderly and documenting agreements made during the 5S’s.

Make up the rules and follow them - make it obvious by visual techniques.
How to Standardize?

• Help everyone know exactly what they are responsible for doing, when it is to be done, where and how it is to be done to maintain the first 3S’s agreements.

• Have clear instructions for people who deliver goods or materials to the site. Clearly mark and post where the material, tools & equipment are to be placed. Educate the supplier on what is expected of him/her.

• Develop checklists for routine tasks
How to Standardize?

- Use a standard 5S’s format for communication boards/binders so they are similar in appearance.

- Develop **standard labeling** and outlining methods for the area or department so that anyone can see when something is out of place.

- Develop **standard**:  
  - Gang Boxes  
  - Visual controls - sign boards  
  - Tools & Equipment  
  - Forms  
  - Yard Lay down areas

- Document all 5S’s agreements and implement any changes.
How to Standardize?

Create improvement opportunities:

- Create a 5-minute 5S’s activity, try to perform any 5S’s clean up or ordering activity as efficiently as possible.

- Work to prevent chaos from coming back by:
  - Making it hard to put things back in the wrong place
  - Making it impossible to put things in the wrong place. (Consider removing excess storage locations or putting an obstacle so excess material can’t be stacked around.)

- Use the “Ask Why 5 times” approach to get to the root cause of why things are not how they are expected or desired to be.
Standardize Using Labels and Color Coding
The 5S's
The 5S's

CINCINNATI SHEAR LONG DROP RACK PROCEDURES

1. Write the gauge of the drop metal on the top right corner of the sheet using a Sharpie or a Paint Pen.

2. Place drop metal in the appropriately labeled pocket.

3. The maximum size drop sheet of Galvanized, Aluminum, or Mild Steel is 18” wide x 61” long.

4. The maximum size drop sheet of Galvanized, Aluminum, or Mild Steel is 60” wide x 120” long.

5. The maximum size drop sheet of Stainless Steel or Aluminum is 60” wide x 120” long.

6. The maximum size drop sheet of Stainless Steel or Aluminum is 60” wide x 120” long.

7. Sheet drop smaller than 61” goes in the short drop rack behind the sheets.

8. Damaged or welded on materials go in the appropriately labeled metal dumpster.
Welding Machine Expectations

What welder should look like

A place for everything
- PPE (On top of bottles)
  - Welding Hood
  - Welding Jacket
  - Welding Gloves
- Welding Equipment
  - Ground cord
  - Power cord
  - Whip
  - Bottle caps
- Note: Nothing else on top of welder (ex: Rags, soda cans, tools, consumables, papers, and any other materials)

END OF DAY:
Cords & other items put away on labeled hook.
Guidelines for Office

Copiers

- Post owners name – See owner’s responsibilities list.
- Procedure posted – includes who to call when the copier breaks or supplies are low, how to fix jams, how to operate, how to change toner, etc.
- Kanbans for ordering paper, toner.
- Instruction on how to operate
- Standardize room; i.e. have a table, staple remover, punch, trash can, other?
- Recycle bin in room.
- List of capabilities; e.g. how many pages can it staple, does it staple, will it do two sided copies, etc.
- What preventive maintenance is needed? PM schedule?
- Sign outside of room indicating “copier inside”.
The 5S's

Grunau Service Team
“Bids Pending” and “Active Jobs” Files

Color Coding Per Trade:

<table>
<thead>
<tr>
<th>Color</th>
<th>Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>Fire Protection</td>
</tr>
<tr>
<td>GREEN</td>
<td>Underground</td>
</tr>
<tr>
<td>BLUE</td>
<td>Plumbing</td>
</tr>
<tr>
<td>ORANGE</td>
<td>HVAC</td>
</tr>
<tr>
<td>YELLOW</td>
<td>Electrical &amp; Controls</td>
</tr>
</tbody>
</table>

File Label Structure:

Customer Job Site-Building Name, Suite #  Date of Proposal
Customer Name (Who Pays)                  Description of Work

- File Alphabetically by Customer Job Site – Building Name
- Maintain current and past fiscal year files in Desk Drawers
- Maintain 3rd and 4th year at Central File
- Discard after 5th year

- Remember the last “5S” of Lean is to “Sustain”. Perform a Self-Audit each week to ensure files / desktop / workspace are maintained accordingly.

Rev. 5/20/2005

To continually examine our processes to provide greater value to our customers without waste.
5S’s in the Office
5S’s/Lean Communications Boards

• Use to keep everyone informed
• Post Scores
• Before and after photos
• Spaghetti diagram
• 5S News
• Have short meetings by the board

> Put it in a convenient location
> Keep it current!
Ask Why 5 times
Visual Controls taken too far?

“Now!... That should clear up a few things around here!”
SELF-DISCIPLINE

Follow through with the 5Ss agreements

Make it part of daily work and it becomes a habit
How to create self-discipline

Self-discipline is done when:

• The 5S’s rules for Sorting, Simplifying, Sweeping and Standardizing are being followed.

• All 5S changes have been documented.

• A daily 5S’s activity checklist is posted and used.

• The work area is being kept neat and clean and the work Flows!

• Treasure hunts are reduced!
Points for building self-discipline:

- Be polite in addressing others
- Wear your safety equipment with pride
- Follow the 3 specifics by clearly indicating what (specific items) goes where (specific places) and in what amount (specific amounts).
- Get to the source or root cause of any disorder or dirt.

* Source: 5 Pillars of the Visual Workplace by Hiroyuki Hirano]
Points for building self-discipline

• Money is limited but wisdom is limitless – use the employee’s brainpower to solve problems not the company’s money.

• Improvement requires effort and effort requires enthusiasm.

* Source: *5 Pillars of the Visual Workplace* by Hiroyuki Hirano*
Self Discipline often includes an Self Audit/ Score Card

<table>
<thead>
<tr>
<th>#</th>
<th>Checklist Area</th>
<th>Done</th>
<th>In Progress</th>
<th>Not Started</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Are work benches, trailers, gang boxes and the area free of unnecessary items and are items present used on at least a monthly basis?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Are walk areas unobstructed and marked?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Are lay down areas easily identified for material, mobile carts, tool boxes, lifts, etc.?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do 30 second test!
Opportunities to Sort

Supply Room - Before
Supply Shop after 5S’s
Opportunities to Sort

Electric Shop Warehouse Storage - Before
Electric Shop after 5S's
The 5S's

Tool Crib Before 5S’s
The 5S's

Tool Crib After 5S’s
Gang Box Layout

36” CROW BAR

1/2” DRILL
1/4” DRILL
3/8” DRILL
SCREW SHOOTER
3/8” ANGLE DRILL
DOUBLE CUT

50’ ROPE

8’ CHAIN & PADLOCK

SAFETY BOX

Bassett Mechanical
The 5S's

Gang Box Layout
Porta Power Rack

Before

After
The 5S's

Before

Shop Dollies

After
The 5S's

Tool Room

Before

After

Gurnau Company, Inc - LCI Congress 2010
Plumbing Shop

Before

After

Gurnau Company, Inc - LCI Congress 2010
The 5S's

Shipping Table & Cupboard
The 5S's

Job Site Trailer Before 5S's

After 5S's

Adapted from Walbridge
The 5S's

Simplifying Job Site Trainers

2009 LCI Congress - Joseph Gnazzo Company, Inc.
The 5S's

Simplifying Job
Site Trainers

2009 LCI Congress - Joseph Gnazzo Company, Inc.
Welding Supply Box
The 5S’s

Carts
Rigging Rack Time Study

- Average time usage with old rack: 11 min.
- Average time usage with new rack: 1 min.
- Time difference: 10 min.
- Average of 10 employees use per day = 100 minutes saved per day
- Average worker rate is $.81/min.
- $.81/minute x 100 minutes = on average $81 saved every day
Rigging Rack Time Study (continued)

- Total cost of 3 rigging racks: $3,000
- At $81/day racks are paid off in 37 work days

Note: All time savings is in walking, searching, talking, and hunting for the appropriate tool/equipment (March 1, 2007)
More 5S’s
Standard Procedures for Filing Electronic Documents

Scope for Electronic Files Committee

Our goal is to standardize Tweet/Garot’s file naming convention and document filing structure.

- Identify items and areas to consider
- Standardize document filing structure and file naming convention
- Start with SharePoint, network files, computer workstation/laptop files, and then e-mails
- Train, roll-out, and add to the Onboarding Process
- Follow through

For employees with access to shared drives...

1. Anything shared by your department should be put on your department’s shared drive
   Shared drives include:
   
<table>
<thead>
<tr>
<th>Accounting</th>
<th>Billing</th>
<th>CAD</th>
<th>CPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>E20-I</td>
<td>HVACProjects</td>
<td>Industrial</td>
<td>Industrial Piping</td>
</tr>
<tr>
<td>Industrial Sheetmetal</td>
<td>ITDept</td>
<td>Payables</td>
<td>Payroll</td>
</tr>
<tr>
<td>Plumbing</td>
<td>Safety</td>
<td>SalesBooks</td>
<td>Service</td>
</tr>
</tbody>
</table>

2. Anything work related that doesn’t need to be shared with your department should be stored on your user drive (user drive is named after your Tweet/Garot user name)
   a. On your User Drive have a temporary folder for miscellaneous files that can be deleted periodically

3. Do not put anything work related on your local hard drive (C), My Documents folder, or Desktop. Your My Documents folder is not backed up nightly, your desktop is not backed up at all, and you risk losing any documents.
Van # 144 Plumbing

Before

After

01/16/2009
SAFETY RESULTS

**Reportable Accident Trend - Cast Iron**

- 1998: 154
- 1999: 109
- 2000: 70
- 2001: 43
- 2002: 31
- 2003: 33
- 2004: 18

**Accident Rate Trend - Cast Iron**

- 1998: 114.81
- 1999: 96.10
- 2000: 73.17
- 2001: 51.54
- 2002: 41.06
- 2003: 21.20
5S’s Work!!!

Contractors doing 5S’s report:

- Freed up a space on both sides of the shop (3 foot wide and the length of the shop)
- Returned $5,000 in materials
- Saved 90 field man-hours on one job by reducing crew time getting ready for job
- An accounting department got rid of 18,000 duplicate copies of shop invoices freeing up file space and saving administrative time.
- Cleaned up the main yard - freeing up much needed space.
The 5S’s

**5S In a DPR Construction Trailer**

**Action taken:**

- Revised the layout of the trailer, adding and labeling cubbies and cabinets
- Posted RFI and Submittal logs in clear pocket folders accessible near the plan tables.
- Dumped junk like chairs that didn’t work and were unused since the initial trailer set up.
- Set up a system to replace older submittals, drawings and documents with newer versions.
- Standardized ‘high flow’ processes including RFIs, submittal reviews, drawing log updates, post record documents & subcontract administration.
- Drawings were grouped in logical subdivisions and placed in a central location with easily seen labels.
Another view of 5S’s
Causes of 5S’s not being sustained

- No System (self evaluations)
- No Leadership Commitment
- Not understanding “WHY”
Change Management

20 - 60 - 20 Rule

Critically Against Virtually Everything
People Equation

Involvement + Communications = Engaged Employees
The 5S's

The key attributes of Lean Leaders

- Go See - Muda walk
- Ask ‘Why’ questions
- Show Respect
The 5S's

**Sorting**
Clearly distinguish the needed from the unneeded. Eliminate the unneeded.

*When in doubt - move it out!*

**Simplifying**
Keep needed items in the correct place to allow for easy & immediate use.

**Sweeping**
Keep the workplace swept and clean

**Standardizing**
Document the agreements made during the 5S's.

**Self Discipline**
Make a habit of following the 5S's agreements.

**IMPROVED SAFETY**  **RELIABLE DELIVERIES**  **LOWER COST**
How to Start?

Start Sorting
- Decide on what to keep (auction)

Do Simplification
- Decide on what to put where
- Determine visual identification

Define the Sweeping process

Tip: Take before & after pictures
Levels of Lean Implementation

- Various Tools
- Systematic use of tools & training
- Lean in culture, people & enterprise

Companies ultimately progress or stall at these levels.
The 10 First Steps to Implement the 5S’s

1. Understand the safety is not one of the five (or six) “S’s”.
2. Make it right the first time.
3. Get rid of clutter. Clean the work area of trash, scrap, unneeded tools, material, parts, boxes, etc.
4. Reduce Work-in-progress (WIP) including inventory at the job site.
5. Use Kanban systems to keep and refill consumables (material) so you never run out but not keep too much.
6. Reduce travel time for workers moving material and tools from their storage areas to fabrication, and from the lay-down areas at the job site to the install area.
7. Organize gang/tool boxes and material storage areas to meet the 30-second rule.
8. Make all material/tools stored on job sites mobile.
9. Increase the flow – reduce material & crew waiting.
10. Reduce “get ready “and “clean up” times by organizing how work tools, gang boxes, PPE are stored.
Be a WASTE BUSTER