Operational Excellence Series

Book 3:

Cleaning and Organizing—5S for Printers

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INTRODUCTION

The hidden factory of waste is where people are moving far more than the product is moving. When waste is the focus, there is one issue that is continually spoken of throughout plants: the fact that there are many newer people who have a lesser degree of experience. Although everyone works hard, waste, downtime, and process inefficiencies occur. The lack of understanding process capabilities, poor communications, activities improperly done, inefficient techniques, and mistakes all result in longer production workflow and people moving far more than the product. The typical response to people lacking experience is that they need more training. Although training may very well be needed—people must know what to do and how to do it—the answer lies within the processes themselves.

It must be determined if everything needed to do the job meets people's needs, including information, tools, equipment, and materials, which must:

✓ Be correct
✓ Function properly
✓ Be easily accessible

And it needs to be that way all the time. Process controls and error-proofing methods must be in place and followed. The best practices and techniques need to be continually developed, accepted, implemented, and shared.

A key issue for Operational Excellence and continuous improvement is getting it started. One of the best ways to jump-start the process and establish a solid foundation is by getting everyone involved in cleaning and organizing their processes and work areas. The easiest way to get there is five-step process known as 5S.

The process work environment must be production- and operator-friendly. People typically prefer clean, neat, and very visual process work areas and that everyone consistently follow and adhere to clear, concise procedures and work instructions. People want to achieve clean well-organized work areas. They just don't know how or where to begin.

Other industries have embraced a way to achieve the environment people need from job planning/scheduling, through all manufacturing processes, and culminating when the finished product is shipped to the customer. It's know as the 5S Process. The 5S Process, or simply "5S," is a structured systematic focus on eliminating waste, achieving total organizational cleanliness, and activity stan-
standardization throughout a printer’s work processes. A clean and well-organized workplace results in safer and more productive processes. 5S-process environments typically boost people’s morale, promote a sense of pride in their process, and heighten ownership of their responsibilities. In English, the 5 S’s typically stand for: Sort, Straighten, Shine, Standardize, and Sustain.

**5S—WHAT IS IT?**

5S is an extreme system of cleaning and organizing processes and work areas.

**Seiri—Sort** or clearly distinguish items that are absolutely necessary for the process to effectively function from items that are unnecessary. An objective evaluation of items found in a work area includes the question, “Is it needed? If so, when and how often is it needed?” If the item is unnecessary, then eliminate it. If an item is necessary but infrequently used, then store it somewhere away from the process until it is needed.

**Seiton—Straighten** by taking the necessary items, visually identify them, and store them in locations allowing for effective and immediate retrieval. It is also known as point-of-use storage, which is designed to minimize movement and reduce time looking for necessary information, items, and supplies.

**Seiso—Shine** by keeping equipment and the process area swept and wiped clean. Shine emphasizes removing the dirt, grime, and dust from the work area and equipment inside and out.

**Seiketsu—Standardize** and document procedures and activities for how sort, straighten, and shine will be maintained and how the process area will be kept clean and orderly.

**Shitsuke—Sustain** or establish mechanisms for periodic inspections to achieve and help maintain a 5S culture. Operators must quickly perform daily checks with checklists of how the process is being left by the last people who worked there. Managers should perform weekly inspections and monthly audits.

**5S OBJECTIVES**

- Optimize layout of tools, components, and production process area.
- Improve layout to help reduce non-value-added activities.
- Achieve a process that is cleaned up and organized, then set conditions to keep it that way.
- Allow people who do not typically work in the process to still be able to move around and find what they need—necessary information, tools, and materials—in a timely manner to get the job done.

A major factor in the success of 5S is when the people working in the processes and implementing 5S themselves become the driving force for change. People typically embrace 5S as long as it is sustained.
An important component of 5S is visual management. Visual management is a user-friendly graphic communication system of necessary information which enables people operating equipment and processes to function effectively, efficiently, and error-free with minimal management intervention. Visual management includes very prominently displayed standard operational procedures, performance expectations, quality standards, and production tracking. Visual management is intended to clearly communicate policies and operational requirements without the need for management issuing command and control instructions. Visual management tools are numerous and varied:

✓ Materials and supplies (kanban) signals
✓ Posted safety information, operational procedures, quality standards, and work instructions
✓ Departmental and equipment identification signage
✓ Labels for tools, materials, and supplies—locations, sizes, and amounts
✓ Color-coded tools, equipment, and orders
✓ Digital displays for communicating current job and performance status
✓ Lights and signals identifying ready and not-ready conditions
✓ Lines and borders on the process and floor to delineate workflow direction, staging sites, point-of-use storage, inventory locations, and work areas.

Today, there seems to be almost a predisposition toward complex and intricate solutions and high praise for those who seem to handle complexity well. Typically, effective results can be achieved through simplification and lower cost solutions.

“Simplicity is the ultimate sophistication.”
—Leonardo da Vinci

Many of the ten forms of waste are, in fact, the result of inaccurate, insufficient, and misunderstood information. Making information and conditions simple, accurate, and visual is the supporting principle for process effectiveness, efficiency, and mistake proofing.

Visual management is intended to clearly communicate policies and operational requirements without the need for management issuing command and control instructions.
FUNDAMENTAL KEYS TO 5S

1. **Customer Visit Condition** is when facility and processes conditions are as if customers are going to visit and inspect at any time.

2. **Place for Everything and Everything in Its Place** truly means everything needed must be at arm's length away and/or retrievable within less than 30 seconds. Items should be clearly labeled so anyone should be able to find items and return them to their proper location—even a customer!

The benefits of 5S and visual management are numerous:

- Workplaces and areas are clean, organized, and orderly.
- Workplaces are typically safer with fewer hazards and accidents and reduced amounts of chemicals.
- Morale is enhanced.
- The workflow experiences enhanced efficiency and improved quality.
- Processes are more under control and less materials are needed.
- The system results in reduced waste and costs.
- Training becomes accelerated and more effective.
- Standardizing work becomes a reality.
- The practice provides a solid jump start and foundation for continuous improvement.

**Current State**

The current state is the situation, environment, and conditions a process operates and exists in. An unsatisfactory current state is typically the result of a lack of continuous improvement thinking and culture.

Continuous improvement is a culture where any process, activity, or task can always be made to be quicker, better, and/or cheaper to do.

Take pictures of the current state of Gemba (Japanese term meaning "the real place"), such as the following.

---

**Make Note...**

Continuous improvement is a culture where any process, activity, or task can always be made to be quicker, better, and/or cheaper to do.
Sort

Sort means to clearly distinguish needed items from unneeded items. Sort through everything found in an equipment and process work area, and remove and eliminate all unneeded items—those that are not required for current production or clerical operations.

Sort does not mean remove only the items that you know you may never need. It does not mean that things are simply arranged in a neater fashion. Sort is the act of objectively examining a process area and getting rid of all unwanted, unnecessary, and unrelated items, tools, and materials. Sort says people must remove everything that is not needed or necessary to perform frequent tasks. People must ensure that everything left in the process is necessary to performing daily required tasks and activities.

The number of necessary items must be kept to the absolute minimum. As a result of Sort, simplification of tasks, more effective use of space, and careful procurement of items normally follows.

Sort initially begins by removing and red tagging everything from a process that is not nailed down and place them on skids in a “Sort Red Tag” location.

People must determine what stays and what goes. Keeping many unnecessary things around indicates a just-in-case mindset exists throughout the organization. Sort also dispatches management to eliminate all the reasons for just-in-case. Remove all unneeded items.
What is *needed*?

Sort requires a truly objective assessment of each process in the operation.

- Place all items in the process area in a central location on skids, pallets, and in bins.
- Sort through all items in the Sort area separating needed and unneeded items.
  - Keep what is absolutely necessary for day-to-day and weekly operations.
  - Remove or eliminate what is not needed day-to-day and weekly.
  - Reduce the number of items to the quantity required at any given time.
  - Keep what is absolutely needed for daily and weekly activities.
  - Eliminate what is not needed.
- Reduce the number of items to what is actually required at any given time.

- [ ] Inventory
- [ ] Fixtures and fittings
- [ ] Equipment
- [ ] Storage areas
- [ ] Tools
- [ ] Personal awards and trophies
- [ ] Supplies
- [ ] Wall hangings, doors, etc.
- [ ] Furniture
- [ ] Clutter

**Sort Form: “What is each item used for and how often?”**

Item name: __________________________________________________________

____________________________________________________________________

Does the item have a function in the process area?

- [ ] Yes  - [ ] No

If yes, What is it needed for?

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

How often is it needed?

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
Who needs it?

Is it in the way?

If it is removed, will it really matter?

Should items be thrown away?
☐ Yes  ☐ No

If no, where should it be stored?
The Key: "When in doubt, get it out." Just get them out of there. Sort is the most important 5S step and it must be completed first.

Establish the Sort Rules. Remove all unneeded items to a disposition area. Identify unneeded and misplaced items and attach Red Tags.

Prepare Red Tags to include:
- Name
- Date
- Frequency of use
- Location of item
- Reason for Red Tagging

Evaluate the disposition of all items.
- Identify and attach Red Tags to items.
- Remove Red-Tagged items to a holding area.
- Evaluate Red-Tagged items:
  - Once a day—stage at work area
  - Once a week—store in process area
  - Less than once a month—department parts and component storage area or warehouse
  - Couple of times a year—place in storage
  - Never used—throw away or recycle it

Make Note...

Experience has shown that, when everything is removed and analyzed, typically less than 25% of all items found will be returned to the process for use.
During the Sort phase, experience has shown time and again that, when everything is removed and analyzed, typically less than 25% of all the items found will be returned to the process for use.

**Sort 5S Office Areas**

✓ Identify documents in cabinets, desks, boxes (see Sort form):
  - What documents are needed?
  - How many are needed?
  - How many pens, pencils, staplers are needed?

✓ Discard unnecessary documents:
  - Dated and obsolete documents, memos, and news releases

✓ Classify documents by frequency of use.

✓ Decide on storage and filing methods and storage locations.
### NOTES

<table>
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<tr>
<th>Needed Item</th>
<th>Location</th>
<th>Amounts</th>
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Straighten

**Straighten (Set-In-Order)—**Keep needed items in locations to allow for easy and immediate retrieval.

The basic definition for Straighten is: A place for everything and everything in its place. This means that if people have quick access to items, information, instructions, tooling, materials, and supplies, the process workflow becomes efficient and more productive. The correct place, position, or holder for everything must be chosen carefully in relation to how and where the work will be performed and who will use them. Every single item must be allocated its own place for safekeeping, and each location must be visibly labeled for easy identification.

Straighten, and make orderly, is about process efficiency. Straighten consists of quickly returning all necessary items, instruments, tooling, and materials used in the process, after required activities are completed, in specifically assigned and visually identified places for ease of accessibility. Make it visibly obvious where things belong. Straighten and reorganize the process area to become simple and very visible.

The goal is to minimize people moving and get product moving. For Straighten the “30 Second Rule” applies: People must be able to access anything they need for operational tasks and activities in less than 30 seconds.

To determine waste in an area, begin by creating a map of the processes layout. In the map, draw the current activities workflow that people normally must move through to perform process setups and process production activities. Identify all wasted movement and motion in the process area and reorganize equipment, tooling, and materials.

- Ergonomic, user-friendly environment: Focus on safety and setting height and size limits.
- Point-of-use storage: All needed information, tooling, materials, and supplies are stored in the immediate work area. Identify best locations in proximity for ease of availability.
  - Provide ease of access and return of items.
  - Reduce time spent looking for necessary items.
  - Eliminate frequent trips to remote storage areas.
  - Needed items must be located arm’s length, or one step away, and where tasks are performed.
  - Items are highly visible and centrally located.
  - Items are clearly labeled with rules for use posted.
  - The system increases inventory accuracy by allowing for visual management—enabling vendor-managed inventory when purchases are based on replenishment.
Visual Systems make locations very visible.

✓ Label locations for virtually everything.

✓ Install/paint lines and outlines to identify floor locations for everything from waste bins to premakeready sites.

✓ Limit lines for height, width, minimum and maximum through a process’s area.

✓ Arrows show flow and direction.

**Straighten**

✓ Create a brighter process work area by adding more lighting and painting walls and ceilings white or very light colors.

✓ Group and color code tools and items on boards together in central locations.

Visual identification labels do two things: one, they identify what goes where, and two, they identify what doesn’t go there, preventing areas and locations from becoming cluttered catch-alls.

Use:

✓ Lines and arrows

✓ Labels

✓ Signboards

Place visual signs and boards, with text in a larger type format, for easy reference at process locations. The visual signs and charts must display process quality, performance output, and operational procedures. Visual boards should show:

✓ Safety issues and regulations

✓ Quality requirements

✓ Performance metrics

✓ Production schedules

✓ Standard operating procedures

✓ Management duties and responsibilities

✓ Staff and operator duties and responsibilities.

✓ Material location, type, and quantity

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**Make Note...**

If people have quick access to items, information, instructions, tooling, materials, and supplies, the process workflow becomes efficient and more productive.
Install visible locations and flow:

✓ Divider lines, outlines, arrows showing direction, and limit lines (height, width, minimum/maximum)

✓ Group tools and items together

Labels identify:

✓ What belongs where and how much

✓ Color coding of tools and supplies

✓ Tools and item locations

✓ What does not belong

Visual signs and boards:

✓ Equipment performance metrics information

✓ Kanban—materials and WIP distribution signals

✓ Schedules, production procedures, and quality expectations

✓ Show location, type, quantity, etc.

Look for the obvious “low-hanging fruit” first to get associate buy-in; it’s their process area. This is the test phase; you can make changes later. Carry out easy low-cost decisions.
### Straighten
*Make it visibly obvious where things belong.*

**Process Analysis:** Portable 5S stations for On-site Preventive Maintenance.

<table>
<thead>
<tr>
<th>Item(s)</th>
<th>Correct</th>
<th>Function Properly</th>
<th>Easily Accessible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tools and wrenches</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Extra grease fittings</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Extra lubricants</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Grease guns</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<td>Pre-sized filter</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Oil applicators</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Rags</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Cleaning solvents and chemicals</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Standard operating procedures</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Equipment manual</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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</table>

### Comments and Actions

| Replace tools that are not working | NOW 01/02/11 |
| Get new grease fittings            | NOW 01/02/11 |
| Replace broken grease guns          | NOW 01/02/11 |
| Stage filters at process            | NOW 01/02/11 |
| Stage oil applicators at process    | NOW 01/02/11 |
| Stage cleaning solvents at process  | NOW 01/02/11 |
| Review and establish new SOPs       | NOW 01/02/11 |
| Find and stage equipment manual     | NOW 01/02/11 |

### Signed

The BOSS  What are we waiting for? We’re burning daylight!
**Straighten**

*Make it visibly obvious where things belong.*

Process Analysis:

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Comments and Actions

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Signed

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Cleaning and Organizing—5S for Printers
Shine—Keep the equipment and process and work area swept and wiped clean inside and out. Shine is a program of keeping the process and work area swept and clean of debris. Clean everything, inside and out, then keep it that way.

Shine directs that “everyone is a custodian.” Shine consists of cleaning up the process equipment and area, basically giving it a shine. Cleaning must be done by everyone in the facility, from operators to supervisors, managers, staff, etc. Every process and area in the facility should shine, and cleaning responsibilities should become part of standard operating procedures.

Everyone should see the facility through the eyes of a visitor—always thinking “Are the processes clean enough to impress customers?”

Shine and clean process equipment and area. Whenever equipment is in production mode or down, wipe and clean it and the area.

Inspect through cleaning; look for abnormal wear and conditions. Identify and report components that may be operating outside of specification.

Shine checks:
☐ To see if everything is functioning properly
☐ Is something loose when it should be snug?
☐ Is something snug when it should be loose?
☐ To see if anything needs to be replaced.
☐ Specific equipment targets for necessary repairs.
☐ Everything—see if deep cleaning, repair, or replacement is needed.

Implementing cleaning, orderliness, and organization without establishing 5S standards will typically lose momentum and effectiveness with time.

☑ Identify sources of contamination
☑ Determine targets actions to decrease sources of contamination
  ☐ Debris accumulation
  ☐ Poor work habits
  ☐ Oil leakage

Make Note...
The Shine process provides a good opportunity to inspect through cleaning, paying attention for abnormal wear and conditions.
Materials left by other people
Water leaks
Documents
Dirt and dust
Poor environmental controls
Powder and dust

Shine

Prevent dirt and contamination from recurring and keep it clean, which results in:
- Improved safety
- Fewer breakdowns
- Improved product quality
- More satisfying work environment

Determine cleaning methods:
- Vacuum
- Compressed air
- Dry ice blasting
- Dry and wet rags wiping
- Dry brushing
☐ Get the right and safe cleaning tools and supplies:
  ✓ Equipment: vacuum, floor scrubber, dry-ice blaster, mops, brooms, rags
  ✓ Cleaning chemicals and solvents
  ✓ Eye and hearing protection

☐ Inspect and replace unsatisfactory wires, hoses, tubes, etc.

**Shine: Department**

Equipment/Process: __________________________________________

Methods:

☐ Vacuum: ______________________________

☐ Compressed air: ________________________

☐ Dry ice blasting: ______________________

☐ Dry and wet rags wiping: ______________

☐ Dry brushing: _________________________

☐ Necessary supplies: ____________________

Shine: Process Work Area

________________________________________________________________

Shine: Outside Equipment/Process

________________________________________________________________

Shine: Inside Equipment/Process

________________________________________________________________
**Standardize**

*Standardize* means to create standard ways of maintaining 5S. Establish what, how, and when. "Sort," "Simplify," and "Shine" are performed on a daily basis. "Do the right things the right way, every time!"

Set standards to maintain the first 3 S's:

✓ Red tag procedures—holding area rules and responsibilities
✓ Location, number, position of all items kept in workplace
✓ Schedules for cleaning and cleaning procedures
✓ Documented checklists and procedure for maintaining 5S
  * Daily 5S activities
  * Weekly activities
✓ Use of visual controls
✓ Everything from tooling, safety, and material flow is visually apparent

Integrate 5S into daily work life:

✓ Shift from “fix-it” mentality to “control-it” mentality.
✓ Enable workers to manage their own workspace—but in a standard method.
✓ How can we make sure that changing personnel will not adversely affect our new system?
✓ Team must document all activities, procedures, and checklists.
# Day Shift Essential Duties

<table>
<thead>
<tr>
<th>Day of the Week</th>
<th>Task Description</th>
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| **Monday**      | - Wipe off roll-stand frames with clean rag. Sweep up debris, clean and organize around roll-stand.  
                 | - Wipe down splicer and festoon frames. Clean floor at drive side of splicer and festoon.  
                 | - Clean floor and side frames at units 1 and 2. Remove debris, clutter. Clean under chill-water pipes.  
                 | - Organize and clean the console viewing booth/QA station. Remove old cartons, organize all materials.  
                 | - Remove debris from floor around press. Remove debris from floor. |
| **Tuesday**     | - Ensure all liquid secondary containers around cutter area are properly labeled and located in cabinet.  
                 | - Wipe off guards on drive side of press. Remove dirt, dust, and materials from top of guards.  
                 | - Clean the lenses of all register scanner eyes with clean, dry rag. |
| **Wednesday**   | - Clean floor and side frames at units 3 and 4. Remove debris, clutter. Clean under chill-water pipes.  
                 | - Wipe down splicer and festoon frames. Clean floor at drive side of splicer and festoon.  
                 | - Clean the floor at drive side of printer out-feed. Wipe off guards machine frames. |
| **Thursday**    | - Clean floor and wipe clean Fountain Solution Auto-mix and chiller tanks at units 1, 2, and 3.  
                 | - Clean floor and wipe clean side frames of cutter unit.  
                 | - Sweep floor at drive side of press room. Remove debris from floor. |
| **Friday**      | - Clean floor and wipe clean Fountain Solution Auto-mix unit  
                 | - Organize and clean the console viewing booth/QA station. Remove old cartons, organize all materials.  
                 | - Clean the lenses of all register scanner eyes with clean, dry rag.  
                 | - Wipe down all sides of the cutter, module, and delivery tables with clean, dry rag.  
                 | - Wipe down the hydraulic power unit for cutter. Remove residue film and wipe out drip pan. |
| **Saturday**    | - Clean floor and side frames at units 1 and 2. Remove debris, clutter. Clean under chill-water pipes.  
                 | - Wipe down all sides of the cutter, module, and delivery tables with clean, dry rag.  
                 | - Wipe off roll-stand frames with clean rag. Sweep up debris, clean and organize around roll-stand. |
| **Sunday**      | - Clean floor and side frames at units 3 and 4. Remove debris, clutter. Clean under chill-water pipes.  
                 | - Clean and organize the operator console. Wipe down and organize. Throw out cartons and debris.  
                 | - Clean and organize the ink mixing station. Wipe down, remove clutter.  
                 | - Wipe down the hydraulic power unit for cutter. Remove residue film and wipe out drip pan.  
                 | - Perform ink rollers de-glazing procedures before weekly PM shutdown |
## Daily 5S Checklist

**Sort, Straighten, and Shine**

**Department:**

**Equipment:**

**Shift:**

**Week of:**

**Year:**

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*Manager/Supervisor*

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*Cleaning and Organizing—5S for Printers*
Sustain

*Sustain* means that the 5S program has a discipline that ensures its continued success. 5S mentality becomes ingrained in everyday work life and procedures.

Sustain requires that a verification program be developed so that progress and the previous 4 S' are maintained.

- Periodic Checks and Audits
  - ✔ Daily 5-minute 5S activities
  - ✔ Weekly checks
  - ✔ Monthly audits
- Audit forms, checklists
- Recognition and awards
- Visual systems
  - ✔ 5S communication board
  - ✔ Documented standards and procedures
  - ✔ Before and after photos
  - ✔ 5S audit results
### Work Area 5S Scan Sheet

<table>
<thead>
<tr>
<th>Number of Incidents</th>
<th>Rating Level</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or more</td>
<td>Level 0</td>
<td>12-Sep-08</td>
</tr>
<tr>
<td>4</td>
<td>Level 1</td>
<td></td>
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<td>2</td>
<td>Level 2</td>
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<td>1</td>
<td>Level 3</td>
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<tr>
<td>0</td>
<td>Level 4</td>
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</tbody>
</table>

#### Category: Item

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distinguish between what is needed and not needed</td>
<td></td>
</tr>
<tr>
<td>Unneeded equipment, tools, furniture are present</td>
<td>X</td>
</tr>
<tr>
<td>Unneeded items are on walls, bulletin boards, etc.</td>
<td></td>
</tr>
<tr>
<td>Items clutter up aisles, stairways, corners, etc.</td>
<td></td>
</tr>
<tr>
<td>Unneeded inventory, supplies, parts, or materials are present</td>
<td></td>
</tr>
<tr>
<td>Safety hazards (water, oil, chemical, machines) exist</td>
<td></td>
</tr>
<tr>
<td>A place for everything and everything in its place</td>
<td></td>
</tr>
<tr>
<td>Correct places for items are not obvious (shadows &amp; labels)</td>
<td></td>
</tr>
<tr>
<td>Items are not in their correct places</td>
<td></td>
</tr>
<tr>
<td>Aisles, process areas, equipment locations are not indicated</td>
<td></td>
</tr>
<tr>
<td>Items are not put away immediately after use</td>
<td></td>
</tr>
<tr>
<td>Height and quantity limits are not obvious</td>
<td></td>
</tr>
<tr>
<td>Keep equipment and processes clean and organized</td>
<td></td>
</tr>
<tr>
<td>Floors, walls, stairs, and surfaces are not free of dirt, oil, and grease</td>
<td>X</td>
</tr>
<tr>
<td>Equipment is not kept clean and free of dirt, oil, and grease</td>
<td></td>
</tr>
<tr>
<td>Cleaning materials are not easily accessible</td>
<td></td>
</tr>
<tr>
<td>Line, labels, signs, etc., are not clean and unbroken</td>
<td></td>
</tr>
<tr>
<td>Other cleaning problems (of any kind) are present</td>
<td></td>
</tr>
<tr>
<td>Maintain the first three S's</td>
<td></td>
</tr>
<tr>
<td>Necessary process information and policies are not visible</td>
<td></td>
</tr>
<tr>
<td>All standards are not known and visible</td>
<td></td>
</tr>
<tr>
<td>Checklists do not exist for 5S, maintenance, and quality</td>
<td></td>
</tr>
<tr>
<td>All quantities and limits are not easily recognizable</td>
<td></td>
</tr>
<tr>
<td>Items cannot be located within 30 seconds</td>
<td></td>
</tr>
<tr>
<td>Stick to the rules and standards</td>
<td></td>
</tr>
<tr>
<td>Associates have not had 5S training</td>
<td></td>
</tr>
<tr>
<td>Daily 5S not performed</td>
<td></td>
</tr>
<tr>
<td>Personal items not stored</td>
<td></td>
</tr>
<tr>
<td>Job aids not available or up to date</td>
<td></td>
</tr>
<tr>
<td>Daily 5S inspections not performed</td>
<td></td>
</tr>
</tbody>
</table>

#### Score Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Sort</th>
<th>Straighten</th>
<th>Shine</th>
<th>Standard</th>
<th>Sustain</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-Sep-08</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Score</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Target</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

#### Comments:

- Additional comments or notes related to the 5S audit.

#### 5S Auditor:

- Name and signature of the 5S auditor.
### Work Area 5S Scan Sheet

<table>
<thead>
<tr>
<th>Number of Incidents</th>
<th>Rating Level</th>
<th>Date</th>
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<td></td>
</tr>
<tr>
<td>0</td>
<td>Level 4</td>
<td></td>
</tr>
</tbody>
</table>

#### Category: Item

- **Sort**
  - **Distinguish between what is needed and not needed**
    - Unneeded equipment, tools, furniture are present
    - Unneeded items are on walls, bulletin boards, etc.
    - Items clutter up aisles, stairways, corners, etc.
    - Unneeded inventory, supplies, parts, or materials are present
    - Safety hazards (water, oil, chemical, machines) exist

- **Straighten**
  - **A place for everything and everything in its place**
    - Correct places for items are not obvious (shadows & labels)
    - Items are not in their correct places
    - Aisles, process areas, equipment locations are not indicated
    - Items are not put away immediately after use
    - Height and quantity limits are not obvious

- **Shine**
  - **Keep equipment and processes clean and organized**
    - Floors, walls, stairs, and surfaces are not free of dirt, oil, and grease
    - Equipment is not kept clean and free of dirt, oil, and grease
    - Cleaning materials are not easily accessible
    - Line, labels, signs, etc., are not clean and unbroken
    - Other cleaning problems (of any kind) are present

- **Standardize**
  - **Maintain the first three S's**
    - Necessary process information and policies are not visible
    - All standards are not known and visible
    - Checklists do not exist for 5S, maintenance, and quality
    - All quantities and limits are not easily recognizable
    - Items cannot be located within 30 seconds

- **Sustain**
  - **Stick to the rules and standards**
    - Associates have not had 5S training
    - Daily 5S not performed
    - Personal items not stored
    - Job aids not available or up to date
    - Daily 5S inspections not performed

<table>
<thead>
<tr>
<th>0-Jan-00 Score</th>
<th>Sort</th>
<th>Straighten</th>
<th>Shine</th>
<th>Standard</th>
<th>Sustain</th>
</tr>
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<tbody>
<tr>
<td>Target</td>
<td>20</td>
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</tbody>
</table>

**Comments:**

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**5S Auditor:**
KAIZEN: 5S—SORT, STRAIGHTEN, SHINE, STANDARDIZE, AND SUSTAIN

The goal of 5S is to help reduce time looking for necessary items and to make equipment and process areas easier to get things done. The primary tool for this is the Kaizen Blitz Event. Kaizen (Japanese: “to change, make good, continuous improvement”).

Kaizen events are extremely intense incremental improvement initiatives. Kaizen events create a sense of urgency and energize improvement by focusing the process people on solving the problems.

To begin with, Kaizen events require written purpose and scope.

Purpose

• What process is the event targeting?
• What issue is the event meant to overcome or improve: downtime, changeover time, cycle time, waste, spoilage, etc.

The Scope

• What are the dates and timeline in days the Kaizen event is scheduled to take place?
• Determine and schedule availability of resources including people, time, equipment, and supplies.

Safety

It must be noted that any process improvement ideas, practices, techniques, and procedures must be safe and not put anyone at risk of personal injury. Any practices to the contrary are to be avoided.

Kaizen team membership must include people from the plant:

✓ Equipment operators and crew members
✓ Management and supervision (Champion)
✓ 5S management and technicians

Team rules: Include members who ...

✓ Have equal status
✓ Respect each other
✓ Listen to input
✓ Keep an open mind
✓ Reach consensus when making decisions
✓ Must take responsibility and accountability
  • Get things done
  • Champion and drive change

Cleaning and Organizing—5S for Printers
Project/Event Charter

Project/Event Name: ____________________________

Champion/Team Leader Name: ________________________

Department and Equipment: ____________________________

Current State: __________________________________________

Project/Event Description: ________________________________

Value Driver: □ Safety □ Product Quality

□ Productivity Improvement □ Customer Satisfaction

Start Date: _______________ Projected End Date: ________________

Scope: ____________________________________________________

Approach: ________________________________________________

Key Process Resources and Issues:

________________________________________________________________

________________________________________________________________

Future State Goals:

________________________________________________________________

________________________________________________________________

Performance Metrics:

________________________________________________________________

________________________________________________________________
**Project/Event Charter**

**Project/Event Name:** 5S  
**Champion/Team Leader Name:** Help Get Done  
**Department and Equipment:** Printing Press #2

**Current State:** Work area is dirty, poorly organized, and full of clutter

**Project/Event Description:** Kaizen event to achieve more effective and efficient work area

**Value Driver:**  
- [X] Safety  
- [ ] Product Quality  
- [X] Productivity Improvement  
- [ ] Customer Satisfaction

**Start Date:** 01-10-11  
**Projected End Date:** 01-14-11

**Scope:**  
Utilize team participation, activities, and problem solving

**Approach:**  
Team to implement kaizen, 5S, and visual management

**Key Process Resources and Issues:**  
- Overcome skepticism  
- Get proper equipment, 5S tools, and supplies  
- Get needed corrective 5S done

**Future State Goals:**  
- Achieve a completely clean, organized, and efficient work area  
- Reduce downtime by 25%

**Performance Metrics:**  
- Average makeready time  
- Number of accidents
Team members’ active participation and decisions will be based on team input, analysis, and consensus to **Sustain the Gains**. To ensure a Kaizen event’s success, the team needs to be provided with an environment and tools that are conducive to getting things done effectively and efficiently.

### Kaizen Tools and Equipment Needed

**Team Training, Planning, and Meetings**

- Team meeting room and logistics
- Flipcharts (with sticky back or masking tape for wall mounting)
- Markers (black, red, green, blue)
- Post-It Notes pads (multiple bright colors)
- Digital camera (before and after pictures)
- Before pictures of process and area are taken (digital camera) before event starts
- Labeler and supplies (1/2-in. tape cassettes, black and white)
- Red tags

### Shine Tools, Components, and Supplies

- Protective gear
  - Gloves and eye protection
  - Wear old clothes or throwaway suits
- Dumpster and contractor-strength garbage bags
- Cleaning supplies
- Brooms and dustpans
- Mops and buckets
- Cleaners and degreasers
- Wire brushes, rags, paint scrapers
- Vacuum cleaners and floor scrubbers

---

**Make Note...**

To ensure a Kaizen event’s success, the team needs to have an environment and tools that are conducive to getting things done effectively and efficiently.
Straighten Tools, Components, and Supplies

☐ During the event, team identifies point-of-use storage machine locations
  ☐ Metric and standard tool sets (new)
  ☐ Drawer and trays sets, color coded (trays for supplies)
  ☐ Shadow boards (pegboard) pegboard holders specific for various tools
  ☐ Bulletin board for posting MR/PM procedures and 5S standards

☐ Floor and area marking: white floor marking tape and paint for floor location identification
  ☐ Paint, brushes, masking tape
    ✓ Red—scrap, repair, on-hold, fire/emergency equipment
    ✓ White—cleaning supplies
    ✓ Blue—quality area, gauges
    ✓ Yellow—aisles, locations, machinery

☐ Marking Tape
  ☐ 1-in. and 2-in. vinyl or duct tape
    ✓ Red—scrap, repair, on-hold
    ✓ White—maintenance and cleaning supplies
    ✓ Blue—quality area, gauges
    ✓ Yellow—aisles, locations, machinery
  ☐ 2-in. clear packing tape
  ☐ Tape measure
  ☐ Razor knife/box cutter

☐ May be needed
  ☐ Pegboard
  ☐ Tool holders
- Akro bins
- Small dry-erase board
- Other containers or storage
- Foam to fill drawers
- Plexiglas to replace cabinet doors
KAIZEN BLITZ EVENT STEPS

1. Sort the Current-State Process

The 5S Starting Point—Sort

Kaizen events must have a starting point; that starting point is what is the current state of the process from the standpoint of who, what, and how the process accomplishes its objective.

The Kaizen team members must review the “before” pictures taken of the process and area before the start of the event. The Champion/facilitator must facilitate the team performing a waste walk through the process area.

The Champion/facilitator needs to assign team members participation to various tasks: who, what, and where.

- Locations to sort in the process
- Take “before” pictures of the equipment and process area before the start of the initiative
- Responsibilities for sort dispositions
  ✓ Once a day—stage at work area
  ✓ Once a week—store in process area
  ✓ Less than once a month—department parts and component storage area or warehouse
  ✓ Couple of times a year—place in storage
  ✓ Never used—throw away or recycle it
- Reporting progress and status

2. Straighten

The Kaizen 5S team must confirm the current-state process they have documented, which may not be the real current state. The team must agree by consensus on what the current state really is.

☐ Team personally investigates and visually observes the current state process.

- During personal investigations and observations, spaghetti maps should be drawn to determine the distance operators are walking to retrieve tools and equipment, going to different locations on the equipment or process.
- EXAMPLE of spaghetti map
Spaghetti map—what to looks for and identify:

☐ Number of locations traveled to perform process activities:
   Traveled to 21 locations

☐ Number of process tasks and activities:
   Process took 13 steps

☐ Number of same repeated actions:
   18 repeat actions, all adjustments

☐ Distance traveled:
   638 feet

☐ Total time to complete process:
   96 minutes
Draw your spaghetti map:

<table>
<thead>
<tr>
<th>Department</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

Spaghetti map—what to look for and identify:

☐ Number of locations traveled to perform process activities:

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

☐ Number of process tasks and activities:

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

☐ Number of same repeated actions:

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

☐ Distance traveled:

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
Total time to complete process:

Spaghetti map: Comments and Actions
**Straighten**

Decide where the necessary items need to be located for effective point-of-use access.

<table>
<thead>
<tr>
<th>Item</th>
<th>Site/locations</th>
<th>Storage Method (pegboards, trays, shelves, etc.)</th>
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<tbody>
<tr>
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</table>
3. Shine

The shine emphasizes removing the dirt, grime, and dust from the work area. The Kaizen team must create a future-state or optimized process area by team brainstorming. The team should assign various team members to perform the shine phase of the process area. The team must evaluate and do a checkup before continuing.

☐ Look carefully at the floor, aisles, and around the machines.

☐ How much dirt, oil, ink, dust can you find?

☐ Are any parts of the machines dirty with oil, powder, or ink?

☐ Are any supply lines or pipes oily, dirty, or hard?

☐ Are filters clogged with dirt?

☐ Are light bulbs, reflectors, or shades dirty?

Are areas and components identified for shine phase?

☐ Yes

☐ No

List the identified shine areas and equipment components: 

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________
Shine: Department

Equipment/Process:

Methods:

☐ Vacuum
☐ Compressed air
☐ Dry ice blasting
☐ Dry and wet rags wiping
☐ Dry brushing
☐ Necessary supplies:

Shine: Process Work Area
Shine: Outside Equipment/Process

Shine: Inside Equipment/Process

4. Standardize
☐ Take “after” pictures:
  ✓ Process
  ✓ Dates

☐ Perform a test of the 5S process area:
  ✓ Confirm the effectiveness of the 5S initiative on equipment or process.
  ✓ Test the “30-second rule.”
✓ How long does it take someone who does not work in the process to find items?
✓ Provide a short list of items in the 5S future state process area.
✓ Time, in minutes, how long it takes them to find the items and return them.

**5S Validation Test**

Person Name: __________________ Department Assigned: ________________

Department/Process:

__________________________________________

__________________________________________

List Items                                               Actual Time to Retrieve

1. ______________________

2. ______________________

3. ______________________

4. ______________________

5. ______________________

Total Time: ________________________________________
5S validation test satisfactory?

☐ Yes  ☐ No

* If no, what course of action is needed?

__________________________________________

__________________________________________

__________________________________________

__________________________________________

5. Sustain

After the future-state validation phase of the event, the Kaizen team must perform a debrief of the event. The team will review the future state, how long it took, if problems occurred, and general observations.

Event Debrief

Did the new process times meet or exceeded expectations?

☐ Yes  ☐ No

* If no, why? What should be done next?

__________________________________________

__________________________________________

__________________________________________

__________________________________________

Analyze the event findings:

* Did the desired-state map achieve the planned results? If not, why? What should be done next?

__________________________________________

__________________________________________

__________________________________________

__________________________________________
Where there any unexpected issues encountered? If problems occurred, the team must develop corrective and preventive actions.

Discuss lessons learned:

- Were there difficulties and obstacles?
  - [ ] Yes  [ ] No
- If yes, what were they?
  - [ ] People  [ ] Machine  [ ] Materials  [ ] Methods  [ ] Environment
- Were they overcome?
  - [ ] Yes  [ ] No
- If yes, how were they overcome?
- If no, what should be done next?

How could the Kaizen event be improved before the next event?

Update and revise future process:

- The team, through consensus agreement, establishes the final future state 5S processes.
- The final process is then documented in hard copy or electronic formats or both.
6. Sustain the Gains

Estimate project savings in hours compared to previous times. Develop a verification mechanism including ways to track weekly and monthly 5S time efficiency and cost savings. Then post the 5S time efficiency reports at the processes.

The Kaizen team must establish the methods your team will use to maintain adherence to the new 5S standards

✔ Track performance metrics:

- Trace how much time planned 5S activities (daily, weekly, monthly, quarterly, semiannual, and annual) actually take to complete.
- Track unscheduled downtime from mechanical and electrical failures.

If metrics indicate that 5S time is increasing over 10%, or equipment failures increase by more than 15%, then careful examinations must be conducted, followed by corrective and preventive actions.

✔ Visual management concepts training

✔ Communication boards

✔ Before and after photos

✔ Visual standards and procedures

✔ Quarterly or semiannual assessments of actual 5S activities being carried out.

CONCLUSION

If a printer wants to survive, they must reduce the ten big wastes and create a continuous improvement culture by applying Lean-thinking team-based methods. 5S brings people throughout the organization together in a hands-on interactive environment. Understand that as Operational Excellence is intensifying, as its applications spread throughout the entire company, a consistent culture will begin to emerge that is self-perpetuating and self-directing.

About the Author

Kenneth Rizzo was director of Technical and Lean Services at Printing Industries of America. Ken supported and headed the Center for Technology and Research’s testing and analysis laboratories, process control products, and highly regarded team of experts and educators. A highly experienced process improvement specialist, certified in Six Sigma, ISO 9000, and Lean Manufacturing, Rizzo possessed forty years of commercial and packaging experience. In the mid 1980s as a printing manager Ken underwent training in the Toyota Production System and then coordinated improvement initiatives in a printing plant environment.

Rizzo was a noted industry speaker, experienced trainer, and educator, instructing on various topics including: extreme offset production, printing UV, troubleshooting printing and production problems, and ten steps to Operational Excellence.

A best-selling author, Ken wrote numerous articles for leading industry publications covering technical, operational, and Lean practices. Rizzo was a frequent seminar speaker at major industry events and noted lecturer and trainer. Rizzo also authored Total Production Maintenance: A Guide to the Printing Industry, 3rd Edition (April 2008) (based on Japanese manufacturing Total Productive Maintenance) for printers seeking to optimize uptime through TPM, equipment analysis, equipment critical cares, effective maintenance, process control, and practices for printing Lean.
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Smyrna, GA
www.piag.org

Printing Association of Florida
Orlando, FL
www.pafgraf.org

Printing Industries Alliance
Amherst, NY
www.pialliance.org

Printing Industries of Arizona/New Mexico
Phoenix, AZ
www.piaz.org

Printing Industries Association of San Diego
San Diego, CA
www.piasd.org

Printing Industries Association Inc. of Southern California
Los Angeles, CA
www.piasc.org

Printing Industries of Ohio • N. Kentucky
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www.pianko.org

Printing Industries of the Gulf Coast
Houston, TX
www.pigc.com

Printing Industries of Michigan, Inc.
Southfield, MI
www.print.org

PINE
Southborough, MA
www.pine.org

Visual Media Alliance
San Francisco, CA
www.visualmediaalliance.org

Printing Industries of St. Louis, Inc.
Maryland Heights, MO
www.pistl.org

Printing Industries of Utah
West Jordan, UT
www.piofutah.com

Printing Industries of Virginia
Ashland, VA
www.piva.com

Printing Industries of Wisconsin
Pewaukee, WI
www.piw.org

Printing Industry of Illinois/Indiana Association
Chicago, IL
www.piil.org

Printing Industry Midwest
Roseville, MN
www.pimn.org

The Printing Industry of the Carolinas, Inc.
Charlotte, NC
www.picanet.org

Printing Industry Association of the South
Nashville, TN
www.pias.org
About Printing Industries of America

Printing Industries of America, along with its affiliates, delivers products and services that enhance the growth, efficiency, and profitability of its members and the industry through advocacy, education, research, and technical information.

Printing Industries of America developed from the 1999 merger of the Graphic Arts Technical Foundation (GATF), founded in 1924, and Printing Industries of America (PIA), founded in 1887. This consolidation brought together two powerful partners: the world's largest graphic arts trade association representing an industry with more than 1 million employees and $156 billion in sales and a nonprofit, technical, scientific, and educational organization dedicated to the advancement of the graphic communications industries worldwide.

Printing Industries of America's staff of researchers, educators, and technical specialists helps members in more than 80 countries maintain their competitive edge by increasing productivity, print quality, process control, and environmental compliance and by implementing new techniques and technologies.

In addition to striving to advance a global graphic communications community through conferences, Internet symposia, workshops, consulting, technical support, laboratory services, and publications, Printing Industries of America promotes programs, services, and an environment that helps its members operate profitably.

Many of Printing Industries' members are commercial printers, allied graphic arts firms such as electronic imaging companies, equipment manufacturers, and suppliers. Its special industry groups, sections, and councils were developed to serve the unique needs of specific segments of the print and graphic communications industries and provide members with current information on their specific segment, helping them to meet the business challenges of a constantly changing environment. These groups focus on web offset printing, label printing, binding, financial executives, sales and marketing executives, and digital printing.

Printing Industries Press publishes books on nearly every aspect of the field; training curricula; audiovisuals and digital media; and research and technology reports. It also publishes Printing Industries of America: The Magazine, providing articles on industry technologies, trends, business management practices, economics, benchmarks, forecasts, legislative and regulatory affairs, human and industrial relations issues, sales, marketing, customer service techniques, and management resources. The magazine represents the consolidation of GATFWorld and Management Portfolio, formerly bi-monthly publications of the association.

For more information about Printing Industries of America, special industry groups, sections, products, and services, visit www.printing.org.
Publications of Interest from Printing Industries of America

- *Adding Value to Print*, by Manfred Breede.


- *Digital Production Excellence Accreditation Program Guidelines Booklet*, by Printing Industries of America Staff.

- *Ergonomics Training Program*, a collaboration by Printing Industries of America and others.


- *Lean Printing: Cultural Imperatives for Success*, by Kevin Cooper.


- *Print Production Excellence Accreditation Program Guidelines Booklet*, by Printing Industries of America Staff.


- *Process Controls Primer*, by Joseph Marin.


- *Sheetfed Offset Press Training Curriculum*, by Printing Industries of America Staff.


- *Web Offset Press Problem-Solving Training Program*, by Printing Industries of America Staff.


- *What You Need to Know for Safe Equipment Operation*, a collaboration by Printing Industries of America and others.