Visual Management

Why, What and When?
How?

- Visual Communication
  - Visual Displays
  - Visual Metrics
- Visual Controls
  - Andon
  - T-Card Systems
- Visual Management

Learning Objectives

- The purpose of the this module is to:
  - Understand visual management benefits
  - Introduce several visual management tools for
    - Visual Display
    - Visual Metrics
    - Visual Control
  - Understand how simple visual display and visual control techniques may improve process or work area performances

Group Activity - Trip in Ελλάδα

- Let's imagine we are going to spend our next holidays driving around in a foreign country – let's say in Ελλάδα!

Group Activity - Trip in Ελλάδα (2)

- What would we like to see on our route?

❑ Yes ❑ No

❑ Yes ❑ No

Group Activity - Trip in Ελλάδα (3)

- Or:

❑ Yes ❑ No

❑ Yes ❑ No

Group Activity - Trip in Ελλάδα (4)

- When we arrive at a crossroads, we'd like to be like this:

❑ Yes ❑ No

- Or like this:

❑ Yes ❑ No

Group Activity - Trip in Ελλάδα (5)

- What do we need to stay on our route?

- Controls and measures ❑ Yes ❑ No
- Coordinates ❑ Yes ❑ No
- Actual information ❑ Yes ❑ No

Group Activity - Trip in Ελλάδα (6)

- Or:
  - Redundant information
  - Lack of information

❑ Yes ❑ No

❑ Yes ❑ No

Group Activity - Trip in Ελλάδα (7)

- Or:
  - Not understandable information

❑ Yes ❑ No

❑ Yes ❑ No

Καλά, γυρίστε τον πρώτο στο αριστερό, κατόπιν τρίτο στο αριστερό πάλι, μετά από τη στροφή 200 μ στο δικαίωμα, κατόπιν αριστερά, κατόπιν σωστός, και εκεί είστε!

Why Visual Management?

- Imagine a world without:
  - Standard street signs
  - Traffic lights in the cities
  - Addresses and street tags
  - Score tables during a game
  - Air traffic controls
  - Colours

Why Visual Management?

- Let's return to our jobs. Have you ever been in one of the following situations?

- As a visitor:
  - Did you look for an unknown person on an entire floor with office rooms? Did you find him/her rapidly, without asking repeatedly for help?
  - Did you go for a discussion in a new organisation, without knowing how to reach the exit of the building at the end of the meeting?
  - Is it easy to find your way in a city where the street names are not in a readable alphabet?

- As an employee, inside your own organisation:
  - How did you manage to find someone in your first working day?
  - Is it easy to say when something goes wrong or something is missing?
  - Is it possible to find a certain file in someone else's computer, without asking for directions, in an emergency situation?

Visual Management

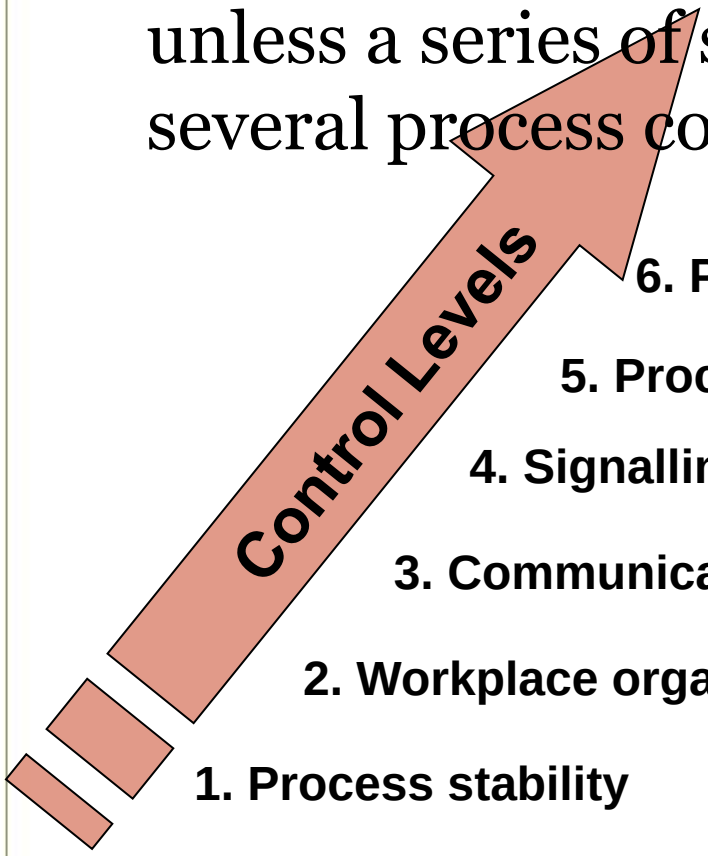
- Benefits:
  - It makes each person's job easier
    - No need for proficiency in "Greek" language
    - No need for stunning memory
    - No need to continuously reinvent hot water
  - It enables managers to perform a better workplace management
    - They provide conditions for self-control to everyone
    - Higher job satisfaction, less frustrations
    - Better communication
  - It improves the overall success of the organisation
    - Order, cleanliness, discipline, safety, shorter lead times, better quality, better behaviours

Visual Management is part of …

- Workplace Management (Gemba Kanri)
  - The system used to set, maintain, control and improve the standard methods needed to perform current tasks
  - It includes several tools:
    - Work standardization
    - 5S
    - Methods for error preventing and control at workplace
      - Poka Yoke
      - Personnel evaluation and training
    - Visual management
      - Providing information using visual means
        - Andon, cards, boards, signals, colours, etc.
    - Kaizen

Visual Management

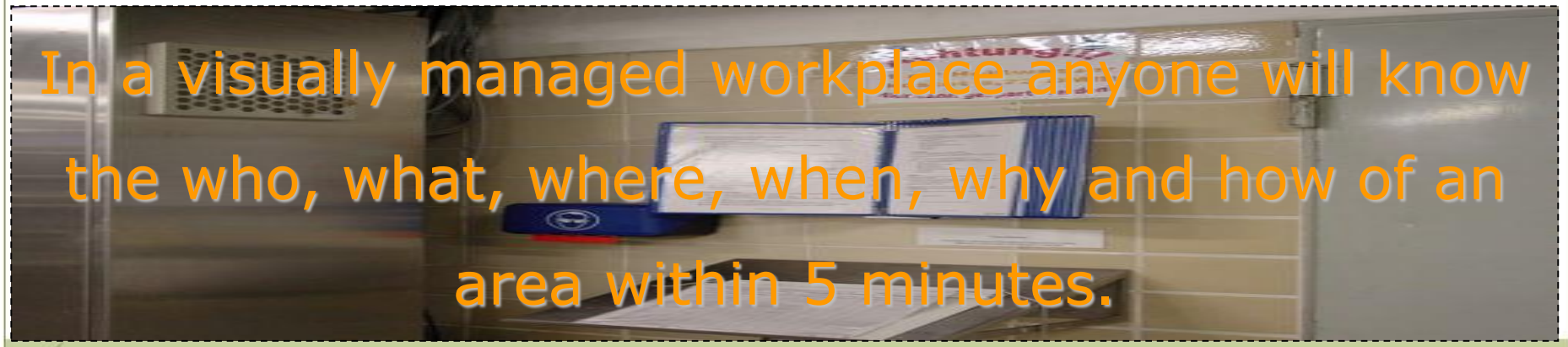
- Visual management is not possible nor useful, unless a series of steps are performed to achieve several process control levels:



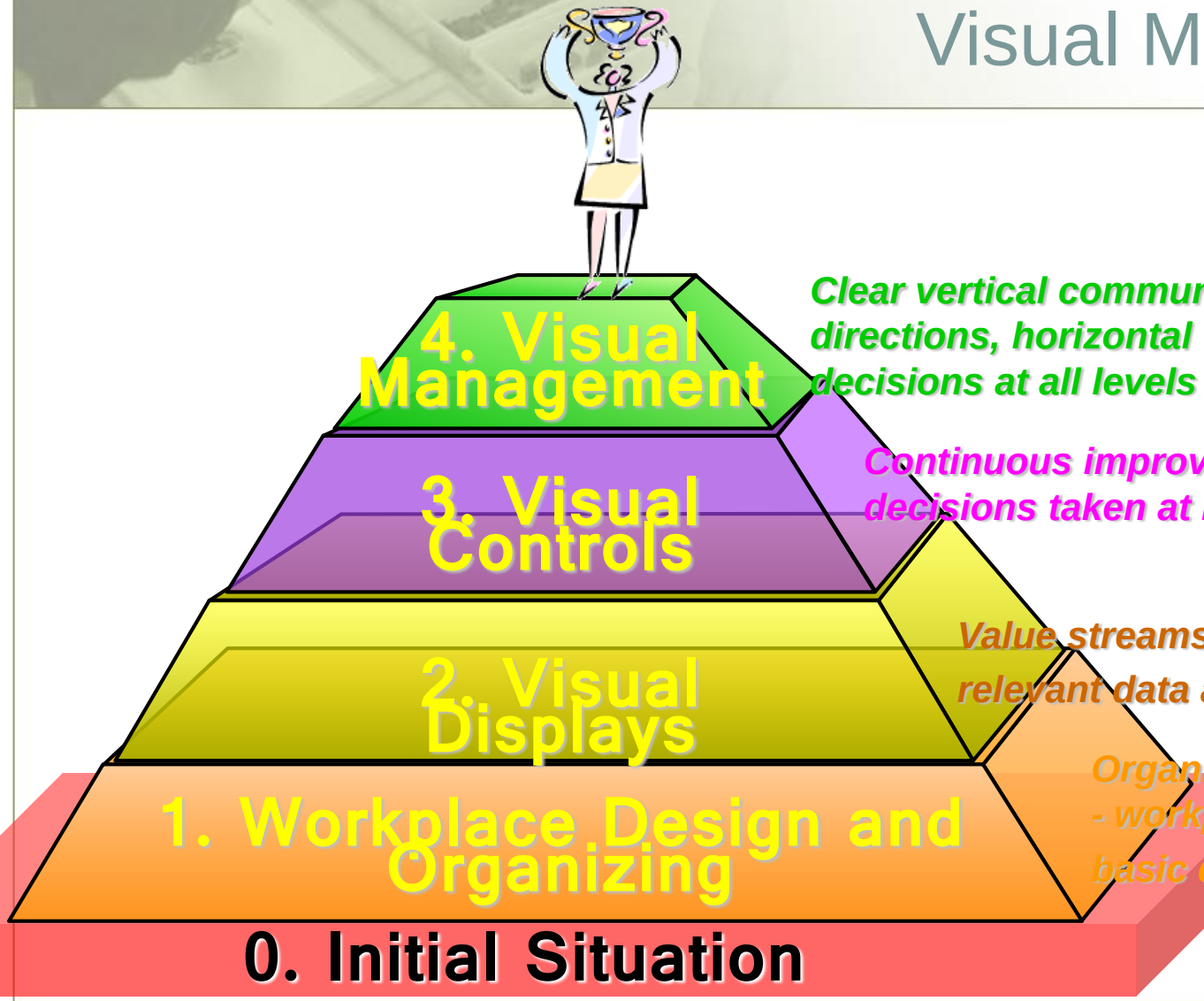
6. Problem solving	Kaizen
5. Process monitoring and analysis	
4. Signalling of abnormalities	Poka Yoke
3. Communication at workplace level	Visual Management
2. Workplace organisation	5S
1. Process stability	Work Standards

So, visual management is …

- The set of methods enabling anyone, anywhere, regardless the workplace, to understand, only on the basis of visual input, if the current situation is normal or not.
  - Do you remember the saying "A picture is worth a thousand words."?



The 4 Steps of the Visual Management



Clear vertical communication in both directions, horizontal cooperation, timely decisions at all levels

Continuous improvement, decisions taken at local level

Value streams identified, relevant data available in real time

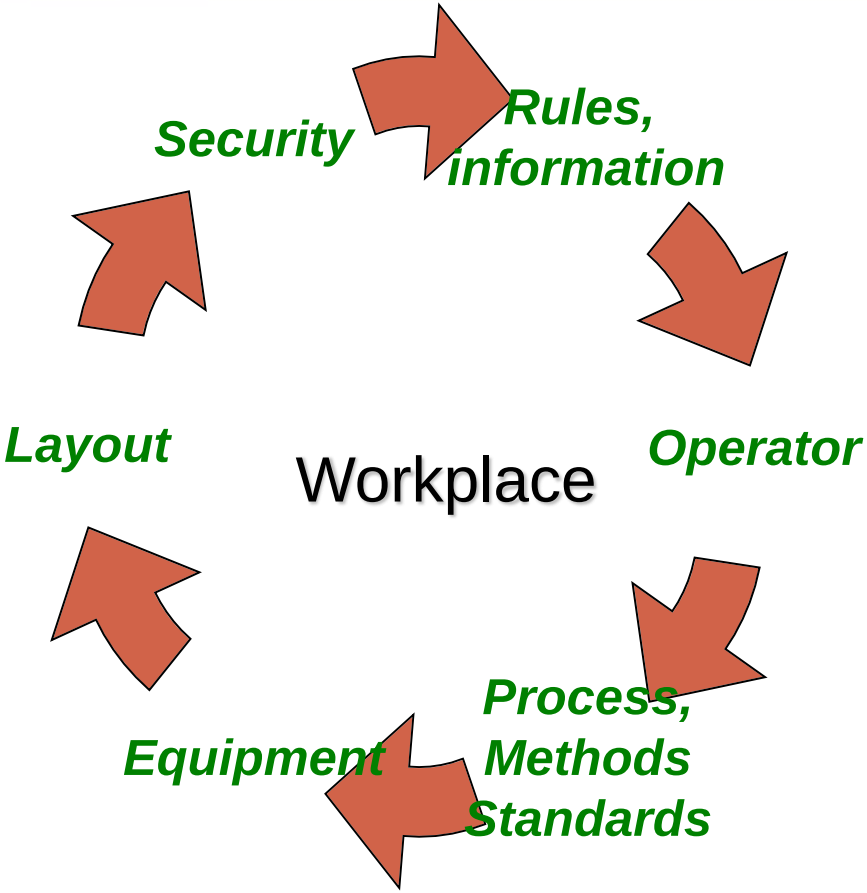
Organized and stable processes - workplace organization (5S), basic discipline, cleanliness

No special interest for visibility, multiple systems

1. Workplace Design and Organizing

Workplace

- Definition:
  - Strictly limited area, equipped with needed working tools and materials, organized for performing a certain work task by a qualified operator, in specific technical, organisational and work safety conditions



Group Activity - Ideal Workplace

- Describe the ideal workplace.
- Does it look like the following?
  - Good output (quality, delivery on time, work satisfaction)
  - Work motivation
  - Safe and pleasant
  - Clean and organised
  - Easy to understand what's happening
  - Self-control
    - Everyone knows what he/she is expected to do, how to do and what to do if there is a difference between the planned/realized output
  - Easy access to information and communication
    - Everyone may see own performances
    - Everyone may communicate to others

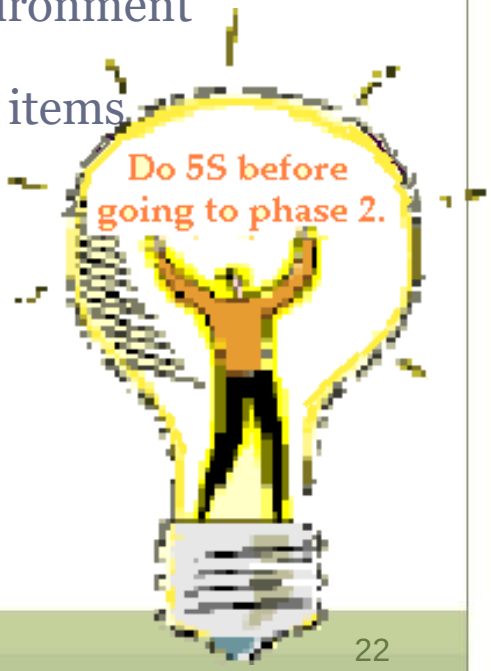
1. Workplace Design and Organizing

- Designing the tasks, the area, the working methods and the needed input:
  - Operator
    - Qualification, competences, cooperation and subordination relationships, responsibilities
  - Equipment
    - Type, quantity, specific operation and maintenance conditions
  - Dimension and layout
    - Position on the process flow
    - Movements, sequence of operations, transfer trajectories
  - Materials, tools, measure equipment
    - Type, quantity, position
  - Process Stability
    - Standard work methods
      - Standard time, standard methods, specific rules (technical, technological, health and safety, environment protection, etc.)
      - Ergonomics – basic principles
        - Principle of gravitational force; Principle of grouping; Principle of fixed place; Principle of work; safety; Principle of movement symmetry, simultaneity and continuity; Principle of logical sequence of work operations
  - Etc.

Example - Workplaces

Tasks for Workplace Organizing

- Identify and assign codes to departments, areas, workplaces
- Identify existing activities, resources, procedures
- Identify members of the work teams
- Set rules for demarcation and standard dimensions for certain types of work elements
  - Floor areas (Kanban areas, access pathways, places for equipment and due materials – including materials for work safety, environment protection, transport lanes, etc.)
  - Areas for tools, shelves, devices, furniture, other needed items
- Set technical areas – archiving, control, WIP inventories, etc.
- Set communication areas and means
- Select adequate information to display at each workplace
- Set the quantity and place of adequate cleaning items and materials



2. Visual Communication

How? - Visual Displays

What? - Visual Metrics

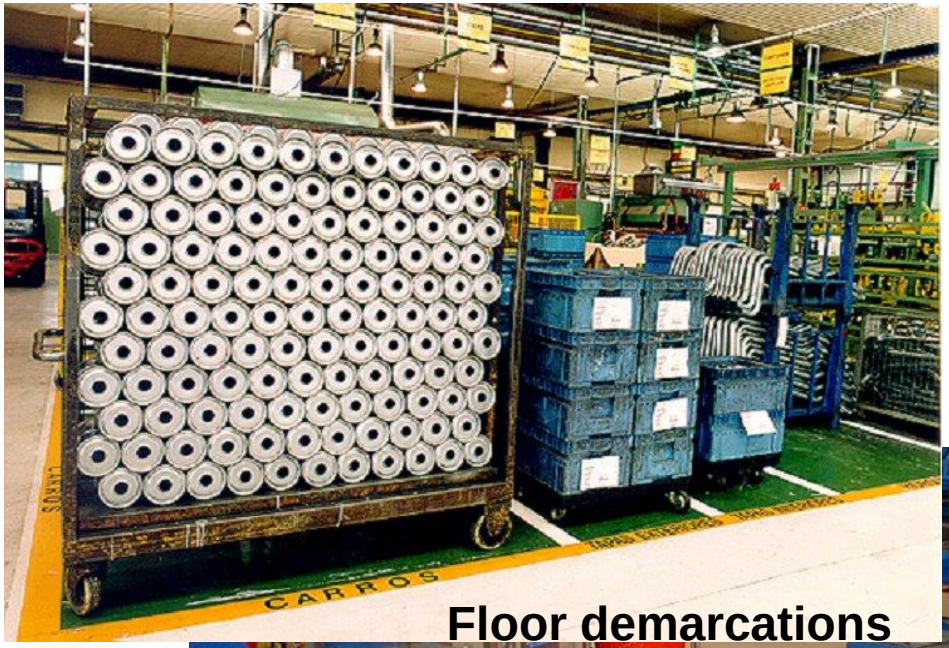
2. Visual Displays

- Aim:
  - COMMUNICATION
- Definition
  - Elements for visual communication of relevant information at each workplace
- Visual displays share relevant information and / or standards regarding the specific workplace
  - Show how to do the job (work instructions / standard, agreed-upon best practice)
  - Show how to use and place/store things around the workplace
  - Show performance status against planned targets
  - Identify risks and hazardous areas

Types of Visual Displays

- There are different types of visual displays:
  - Demarcations and area limits
    - Dangerous areas
    - Access pathways and transport lanes
    - Process flows
    - Locations for max./min. WIP inventories
    - Non-conforming product areas, etc.
  - Production Boards
    - Process metrics, to show required & actual outputs for an area
  - Printed documents
    - Standard work instructions, process layouts, work procedures, etc
    - Plans (audit plan, 5S assessment plan, delivery plans, etc.)
    - Safety instructions
    - General plant information
  - Other specific types:
    - Signs
    - Posters
    - Labels
    - Check sheets
    - Defective item displays
    - Red tag strategy (5S)
    - Kanban cards (office and factory environment)
    - Fluid level markings
    - Direction of rotation for motors
    - Lube-point identification
    - Storage locations – Tools, cleaning supplies, forklifts, material storage, etc
    - Heat sensor stickers
    - Charts showing normal operating ranges
    - Error prevention boards – show best practices on common errors
    - Etc.

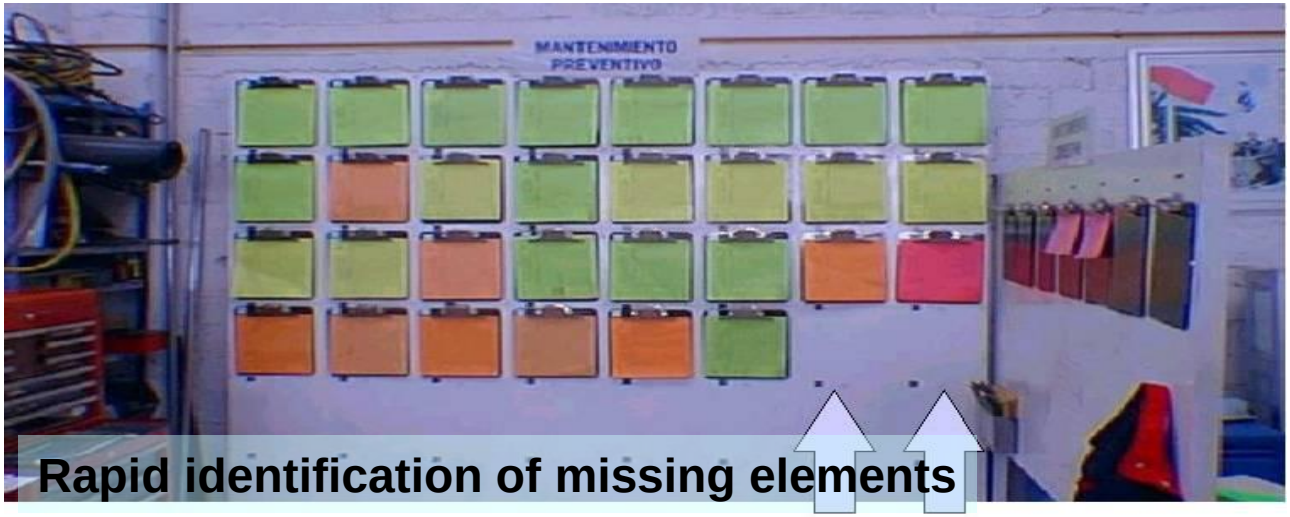
Examples - Area Demarcation



Example - Other Visual Displays

Pathways and transport lanes

Examples - Other Visual Displays (2)



Rapid identification of missing elements

- ATENTION!
  - EACH NEEDED ELEMENT SHOULD HAVE ITS PLACE!
  - EACH PLACE FOR A CERTAIN ELEMENT SHOULD SHOW:
    - THE CODE AND THE MIN./MAX. QUANTITY OF SIMILAR ELEMENTS ALLOWED!
    - IF SOMETHING IS MISSING OR MISPLACED
      - ELEMENT WITH A DIFFERENT CODE, BIGGER/LOWER QUANTITY THAN PLANNED, MISSING ELEMENT

Example - Other Visual Displays (3)

Other Visual Display Types

Communication Board

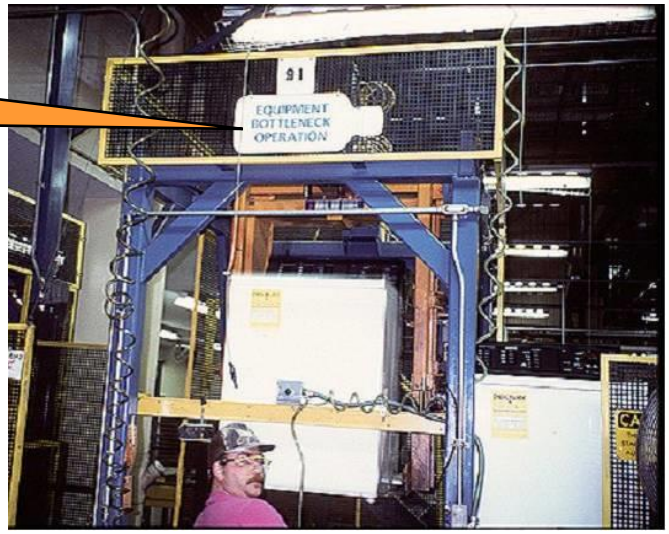
Safety Warnings

Standard Work Instructions

Checklist

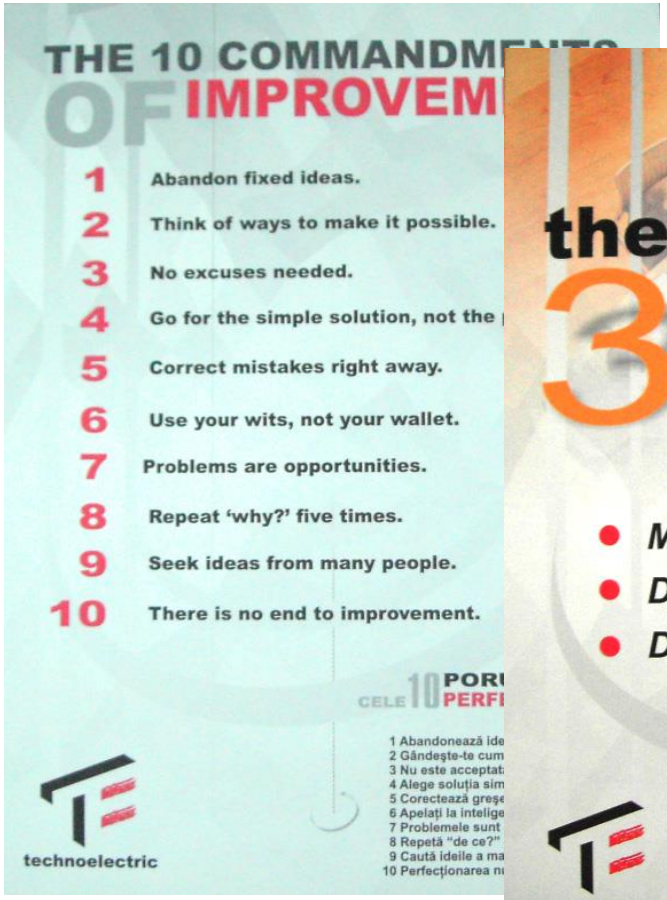
Other Visual Display Types (2)

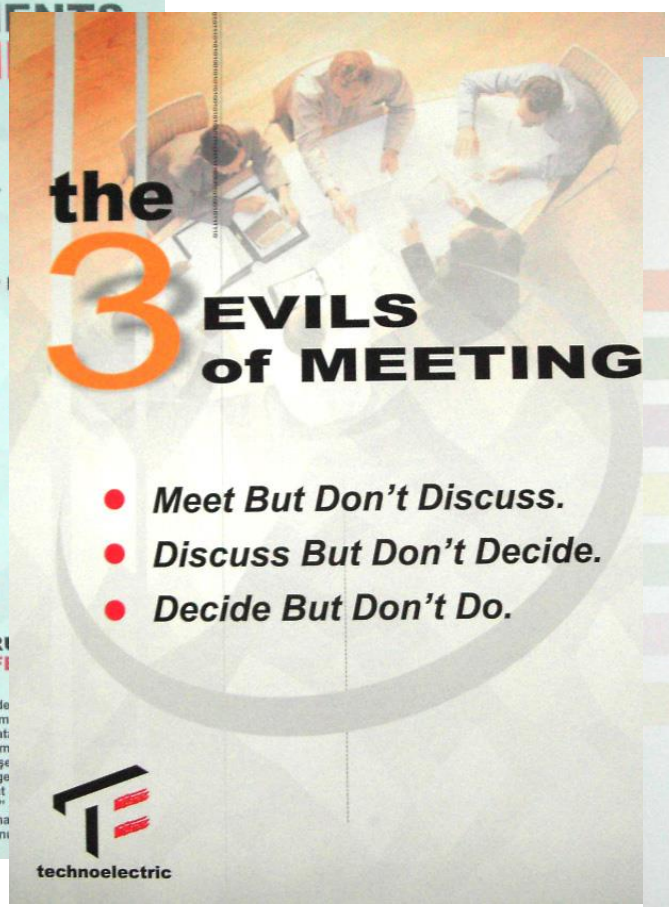
- Labels
- Pictures
- Electronic boards



Other Visual Display Types (3)

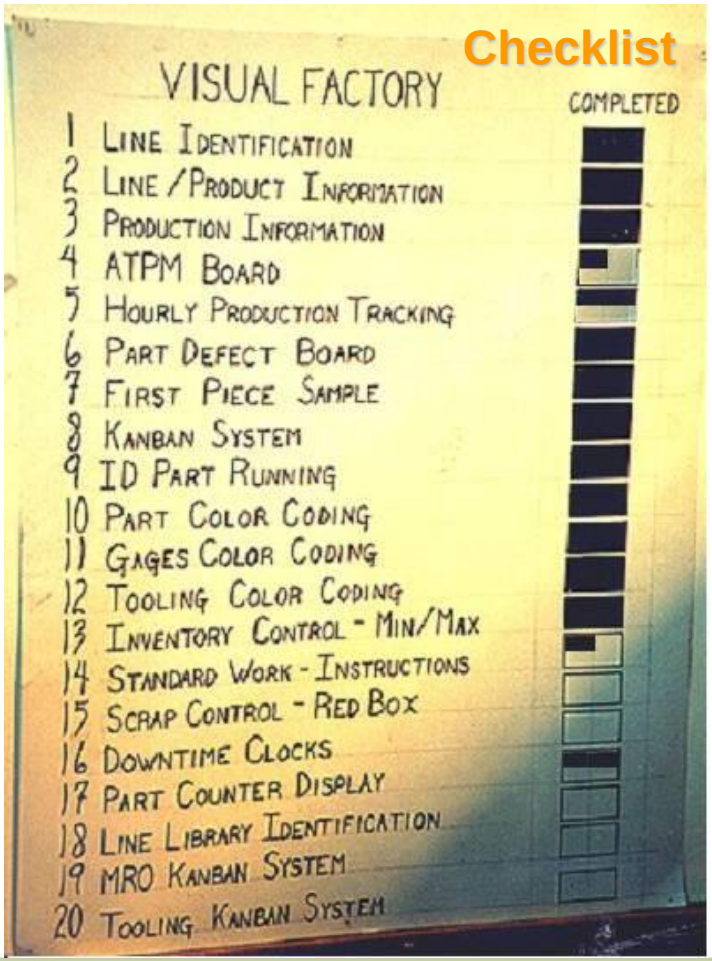
Posters



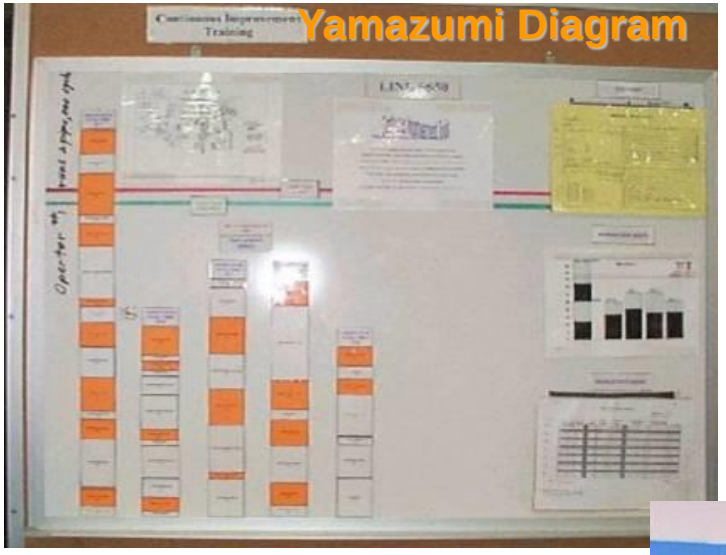


Other Visual Display Types (4)

Checklist



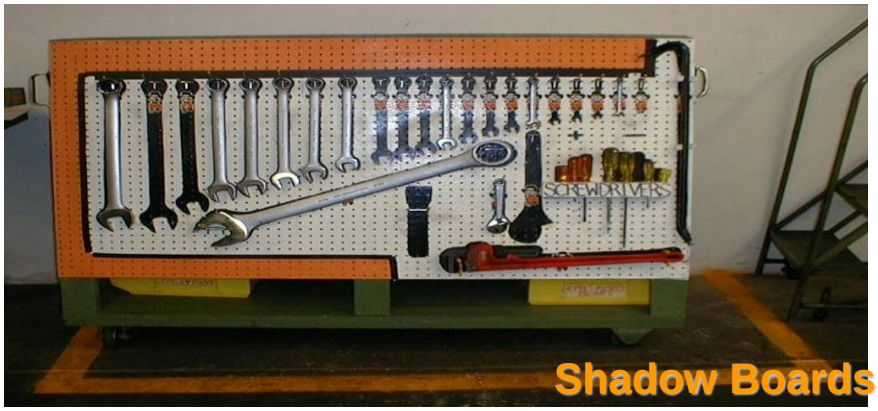
Yamazumi Diagram



Red Tag

"Zero Accidents" Campaign

Other Visual Display Types (4)



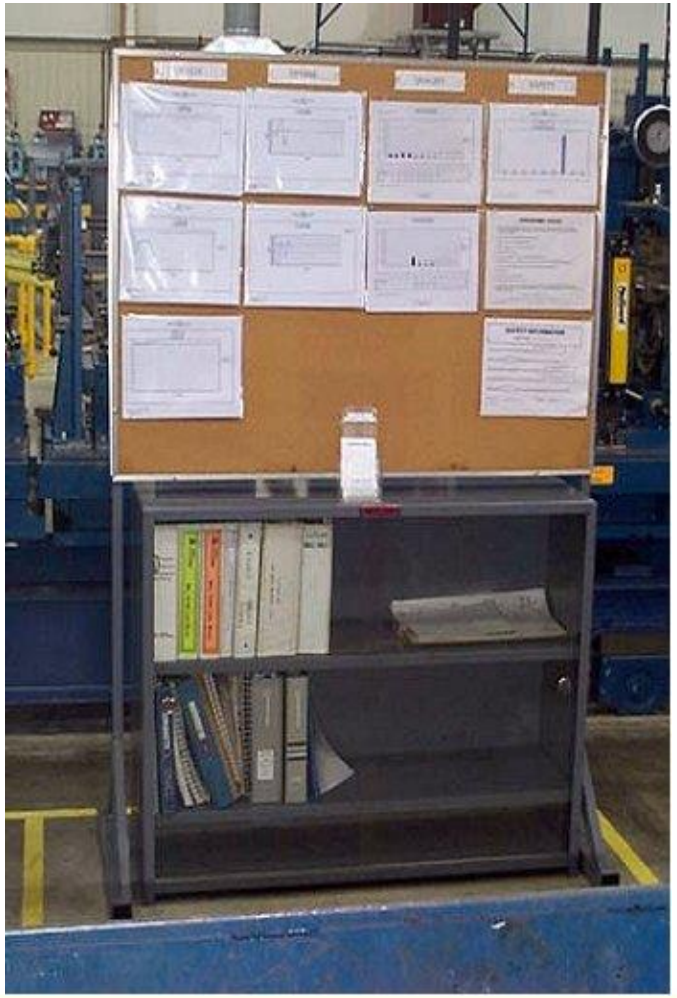
Other Visual Display Types (5)

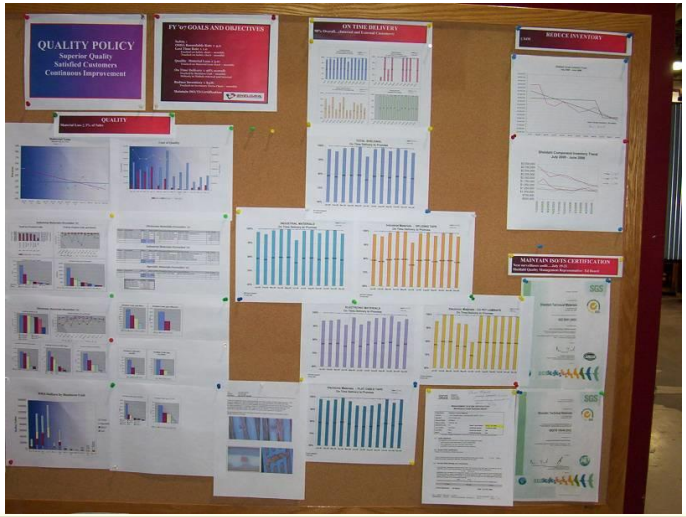
- Defective item displays:
  - Shows number of defective items & types of defects
    - Check sheets, Pareto charts, etc.
- Definition:
  - A list of check-off items used to quickly and easily collect data in a simple standardized format, to be used for a quantitative analysis
- Purpose:
  - Facilitates data collection by providing a standardized format for recording facts

- Example:

DEFECT TYPE	DEFECT COUNT	SUBTOTAL
Wrong Form	𝍸 𝍸 𝍸	15
No Approval	𝍸	5
Invalid Data	𝍸 𝍸 | | |	13
Not on File	𝍸 |||	8
	Grand Total	41

Example - Production Boards





Visual Displays

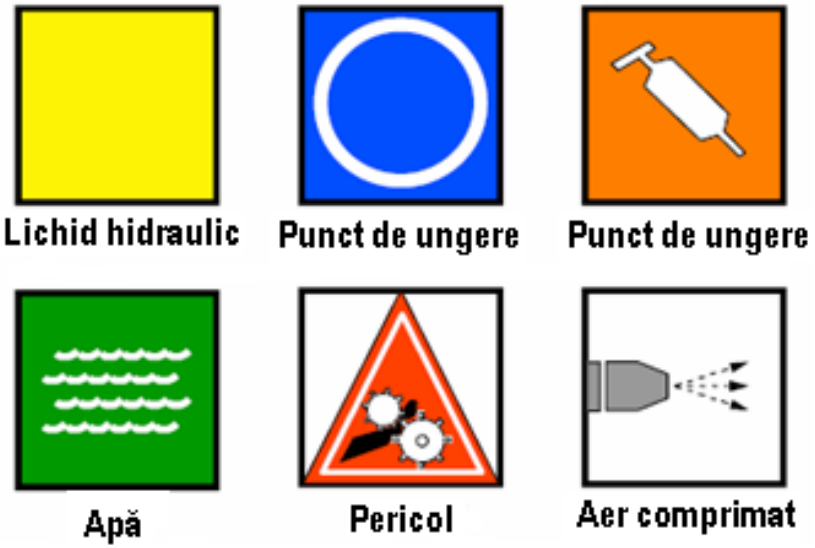
- How the information is communicated depends on the desired end result.
- The location and method of information delivery also depends on the relevancy of the information and target groups
  - Work instructions are typically posted in the production areas
    - Usually highly visual instructions with photographs and graphics
  - General plant information
    - Typically posted in a central location where everyone has access to it
  - Process metrics, usually posted near the workplace
    - Diagrams, tables, pictures, checksheets

Demarcation and Signalling Strategies

- Signboards and signposts
  - To point direction, location, type of item, quantity, etc.
- Colour codes
  - Colours may have different meanings, but always the most suggestive ones
- Labels
  - On every item
    - At least for annual inventory purposes, even for personal items existing at workplace
  - Clear and easy readable label
    - Name, serial number or identification code, place, position, max./min. quantity
- Location maps

- Aim:
  - One place for every item and each item at its place
    - A clear place for each item
    - A clear address of each place
      - Area, shelf, position, etc.
    - Each item is labelled – name, owner, code, location address

Example – Signposts

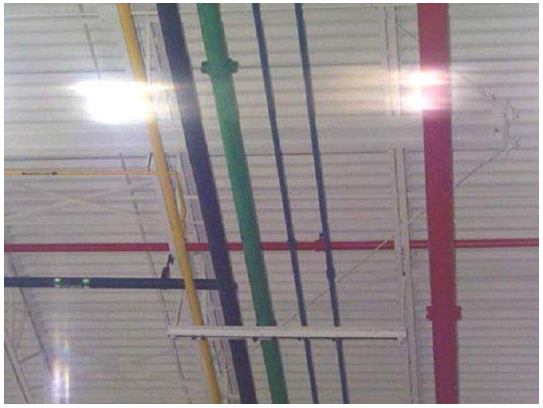


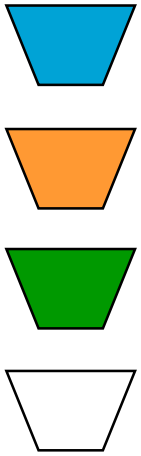
Types of Demarcation Lines

- Line demarcations - painted lines or adhesive tape
  - Floors & Aisles
  - For access pathways and production areas
    - Usually yellow
  - For marking equipment position
    - Shape of equipment stopped
    - Shape of equipment during functioning
  - For marking the area needed for opening the doors or for cranes during operation
  - For marking areas for WIP inventories
    - Surface
    - Stack Height Limits
  - For dangerous areas
  - Arrows to point directions

Colour Coding

- Purpose:
  - Identify specific or critical items, parts and areas with common colors to allow any employee or visitor to easily understand safety or production requirements
- Colours are used to:
  - Delimitate areas
    - Usually white or yellow for access pathways
    - Green for marking positions
    - Red for limits for inventory or floor marks non-conforming products
  - Mark differences
    - Personal equipment with different colours for different areas or for different qualifications (as in hospitals)
    - Different components, tools, measuring devices, etc.





- Production waste

- Transport waste

- Warehouse waste

- Other type of waste

- Other colour codes (example):
  - Red — *dangerous area, non-conform products*
  - Yellow — *access pathways*
  - Blue — *buffer or safety inventories*
  - Green — *WIP*
  - White — *materials to be moved*
  - Yellow and black — *waste, rejected materials*
  - White and red — *non-conforming materials*

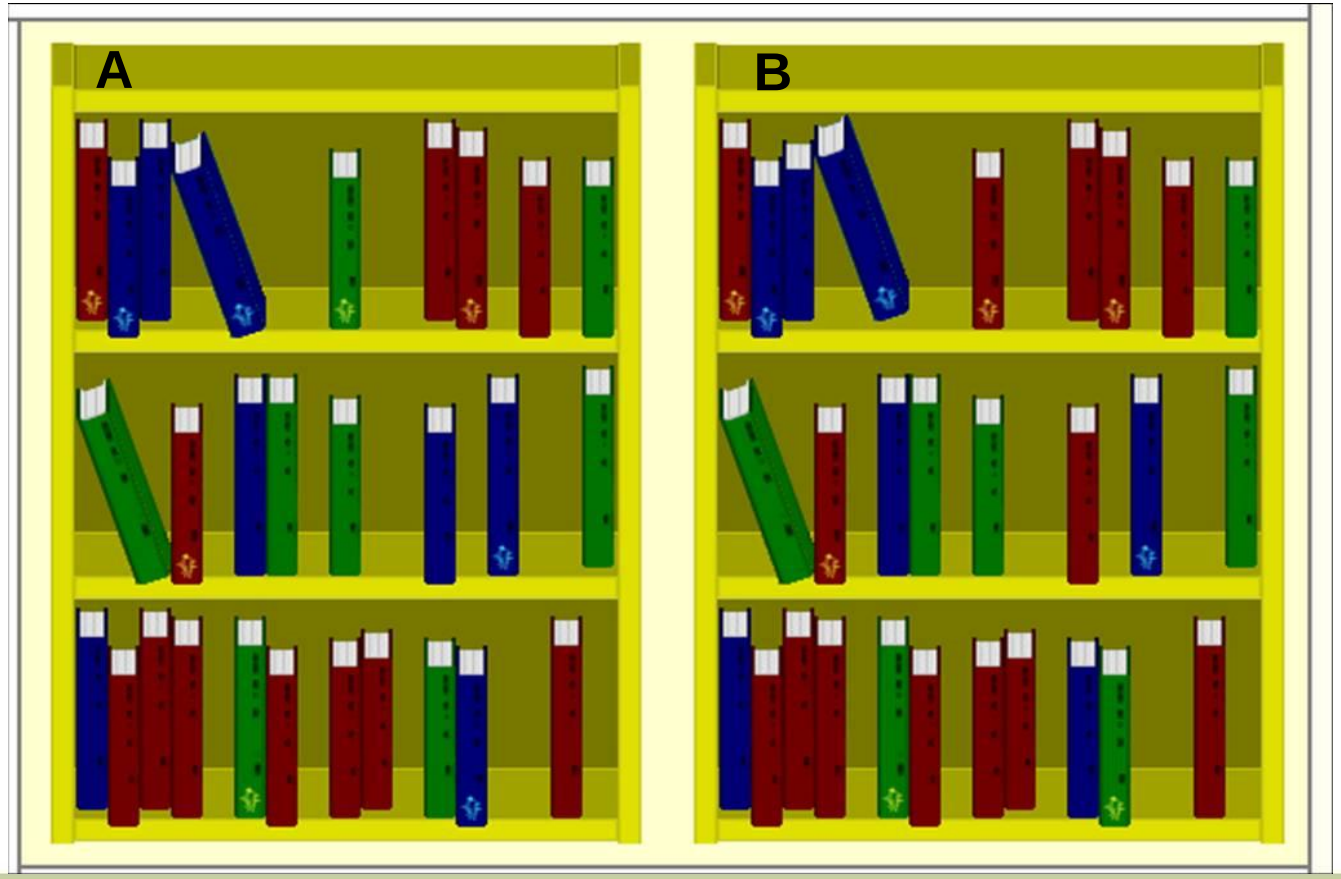
Example - Scrap Cage

Steps for Preparing Visual Displays

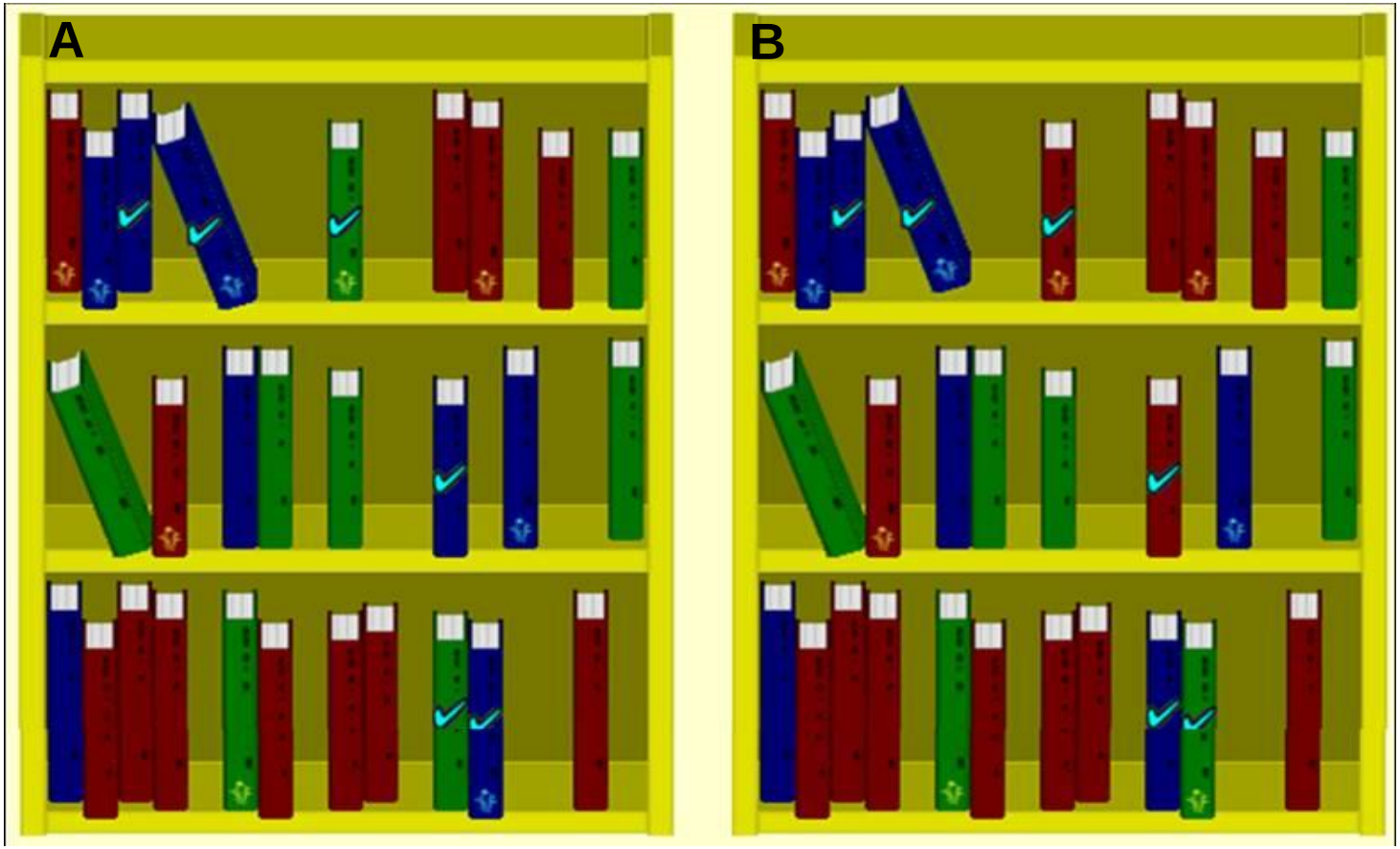
- Selecting the topic to be presented
- Selecting the relevant features, regarding the topic
- Identification of the target group
- Selecting the most adequate location of the visual display
- Development and testing of the visual display
- Improvement and final put on view of the visual display
- Set the updating and check system

Let's do a short game!

- Find the 6 differences in the shelves below:



Solution:



Are there any ideas to improve the identification time?

Example – Production Board

Recommendations for Team Boards

- Used for:
  - Communication of planned targets and actual results
  - Analysis and problem solving
  - Assessment of results
- Specific for each workplace, but the board layout should be consistent for all workplaces
  - Same type of information should be showed in the same position, regardless of the workplace, using similar measures and scale
- Available in short distance next to the workplace
  - Anyway charts & signs must be visible at a distance
- Information should be:
  - Easily understood by the target group
  - Simple updating method
  - Attractive – easy to catch the viewer's attention
    - Usually – images, diagrams, pictures, models, emoticons (☺), colour codes, examples, comparisons
- Information showed should be sufficient and necessary to achieve the planned objective (constant comparison between standard and performance to that standard)
  - More information causes confusion
  - Less information do not motivate the operator
- System in place for updating and checking the updated information
  - Involve all employees in the visual management process.
- Do not use visual management to identify and punish errors
  - But to early identification of problems to be solved in a blameless environment

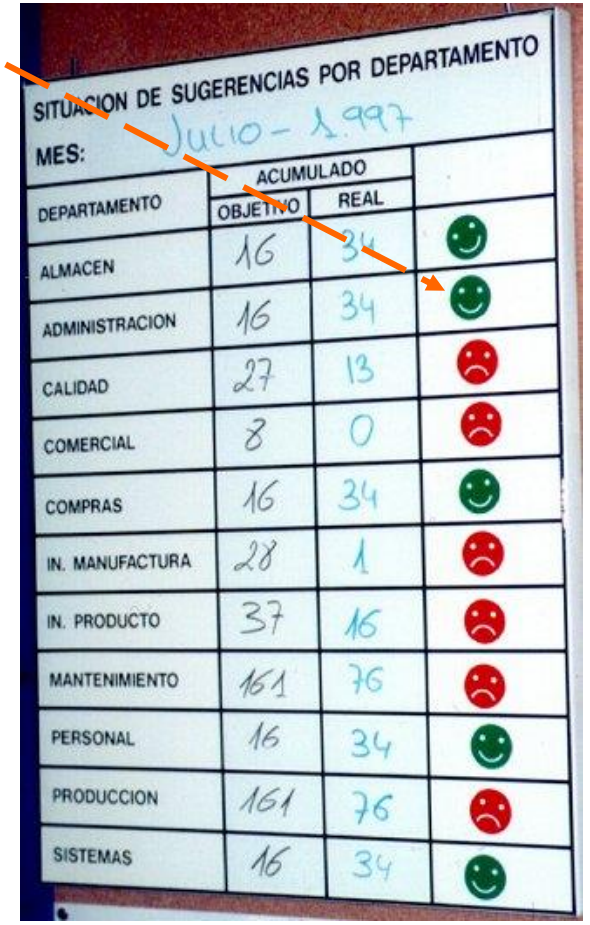
Examples

- Colour coding

- Symbols

Objective	Status 2005	Objective 2006	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD 2006	YTD Obj.	R/Y/G
Lost Time Case Rate	0.78	0.63	0.49												0.49	0.63	G
Accident Severity Rate	17.8	10.2	1.5												1.5	10.2	G
Forklift free	77%	88% YE	77%												77%	78%	Y
Customer Satisfaction @ 3MIS NCBS Focus/C-Max	- / 53	44 / 47	- / 53												- / 53	44 / 47	G
Things Gone Wrong (@3 MIS) GQRS Focus/C-Max	2.118 / 2.557	1,800 / 1,850	2.290/2.587												2.290/2.587	1.800/1.850	R R
Repairs/1000 @ 0 MIS Focus/C-Max	20.7 / 21.2	17 / 17	16,4 /17.0												16,4 /17.0	17 / 17	G G
Repairs/1000 @ 3 MIS Focus/C-Max	172 / 266	140 / 180	116 / 137												116 / 137	140 / 180	G G
Warranty Cost per Unit @ 3 MIS Focus/C-Max	32 / 60	22.5 / 29.7	26.7 / 31.1												26.7 / 31.1	22.5 / 29.7	Y Y
6-Sigma - Y1 - Improve Customer satisfaction (TGW's)	7.57	3	0												0	0	G
6-Sigma - Y2 - Reduce Variability and Eliminate Defects (Hard Savings)	3.320	2,700	689												689	250	G
6-Sigma - X5 - Number of Black Belt Projects	16	18	4												4	3	G
Flawless Launch - Meet Job 1 targets (FCPA / FTT / PTS / Manning)	-	0 reds	0												0	0	G
FCPA: B40+ calls / demerits/ Focus/C-Max	354 / 3.7 / 6 349 / 3.8 / 5	350 / 03 / 06	326 / 3.7 / 5 358 / 4.0 / 5												326 / 3.7 / 5 358 / 4.0 / 5	400 / 3 / 6	G Y
First Time Through (FTT) - Focus/C-Max	36.8%	45% YE	37.2%												37.2%	36.6%	G
Production to Schedule (Units Lost)	(273)	0	0												0	0	G
Vehicles on Wheels (excluding Launch)	610	397	455 / 12 [4]												455 / 12 [4]	397	Y
FPS Integrated Assessment	6.7 [1]	7.7 [1]	6.7 [1]												6.7 [1]	7.7 [1]	G
Hits per Hour	491	525	529												529	514	G
FCSD % Parts Delivered on time	90.8%	95% YE	99.4%												99.4%	90.0%	G
Number of cars older than 5 days in Plant (excl. Launch)	73	1.5% / 26 YE	69												69	36	Y
Total Labour and Overhead Performance to Budget	4.0	0.0	0.8												0.8	0.0	G
Total Launch Cost Performance to Budget	2.3	0.0	0.0												0.0	0.0	G
Cost Per Unit (Full Year L&O / Full Year Volume)	1.268 [2]	1,242 YE	1274												1274	1282	G
Inventory $m (excl. Stockpile/Stockpile)	48.1/3.3 YE [2]	56.0/0.0 YE	67 / 1.06												67.00	69.8	G
Days Supply	2.15	2.07	2.16												2.16	2.20	G
Harbour Hours / Unit (excl. / incl. Launch)	17.60 [3]	16.65 [3]	17.25												16.64	16.65	G
Open Major Audit Comments	0	0 / 1 [4]	-												-	-	G
MCRP's (Completion vs Schedule)	100%	100%	-												-	-	G
Total Paint Cost per Unit (L & O content)	197	192 YE	179												179	203	G
Pulse - Employee Satisfaction Index	64	67	64												64	67	G
Total / Unplanned Absence (pct. of total hourlies)	16.5 / 6.2	14.1 [5] / 5.3	12.9 / 5.2												12.9 / 5.2	14.1 / 5.3	G G
Suggestions per employee	0.93	1.0	0.08												0.08	0.08	G
ISO 14001 Major non-conformity / Legal non-compliance	0 / 0	0 / 0	0 / 0												0 / 0	0 / 0	G
Reduce Energy Consumption [kWh/unit]	1.271	1,477	1944												1944	1798	R
Meet Volatile Organic Compounds (VOC) programm requirements [g/m²]	22	35	22												22	35	G
Reduce waste, water and hydraulic oil consumption	6G	6G	6G												6G	6G	G

2006 scoring method 2) at 2006 budget rate ($1=€1.2375) 3) Full Year Actual/Forecast 4) accepted 5) based on 9 add. free shifts due to scheduled working pattern 6) normal=unusual/unusual supplier quality issues 7) 4rd Qtr. 2005



Visual Metrics

- Process metrics are typically displayed at the workplace (machine or cell)
  - It is most effective when it is delivered in real time
    - Immediate feedback facilitates immediate action, whenever needed
- Purpose
  - Enable a person to self-manage own work
  - Enable management to recognize trends and re-align activities to targets and strategies
- The more information can be simply communicated visually the more it will improve self-control at workplace level.

If you don't plan to use the data, don't collect it!

How to Develop Visual Metrics

- What it is needed to be known, therefore measured?
- Who is the user of the information?
- How to keep track of details?
- How often to collect the data?
- Who will do the measurements?
- Who will show it?
- How to display it?
- Where to locate the display?

Types of Visual Metrics

- What information should be available on workplace boards?
  - Relevant information for the workplace, regarding:
    - Production
      - Production schedule, quality, output, productivity
    - Processes
      - Work standards
      - Specific rules
    - Equipment
      - Working conditions
      - Maintenance schedule
    - Health and safety at workplace
      - Risks
      - Safety plans
    - Work environment
      - Temperature, access rules, etc.
- Determining what information needs to be conveyed to different target groups
  - Selection of relevant indicators
    - Usually, these indicators belong to 5 (or 6) categories, known as 5M or 6M:
      - Manpower (Operators)
      - Machines
      - Materials
      - Methods
      - Measures (input / output)
        - and … MONEY (efficiency)
  - Permanent comparison between planned and actual results

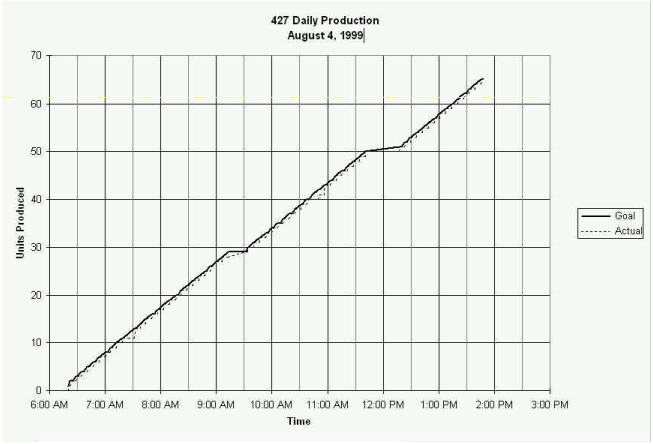
Visual Metrics

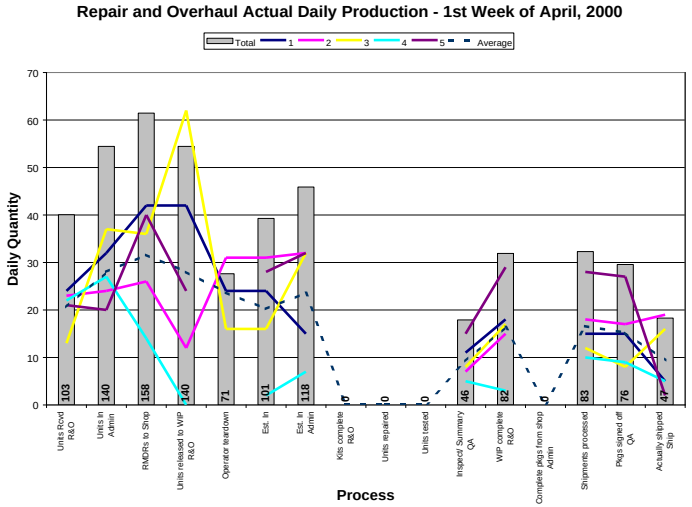
- Characteristics
  - Provide data
    - To people who can act based on the available data
    - In time to act on the data
    - To people affected by the data
  - Visually link results to
    - Performance targets
    - Improvement initiatives
  - Communicate information to workers and management, in a clear and accessible format

Group Activity

- Let's build an Area Board for Accountability department.
  - What information should be displayed for bidirectional communication?
    - For example:
      - Key Customers
      - Process/ Function identification
      - Process Map
      - Value Stream Map (Present, Future States)
      - A control chart with goals
      - Prioritization of problems
      - Action plans and progress
      - key overall metrics
      - Others?

Visual Metrics





- The form of data communication goes from the most simple one (hand written on a piece of paper, a sheet or a white board) to printed charts and electronic boards.

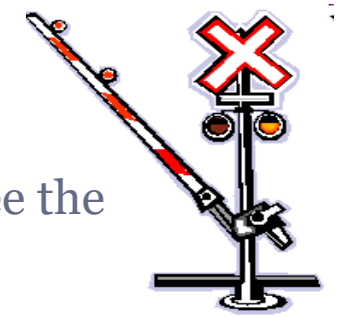
Warning!

- Watch the language used and the information to be provided!

3. Visual Controls

Visual Controls

- Any communication device used at the workplace to readily signal whether something is deviating from the standard
- Aim:
  - CONTROL = to make abnormal conditions obvious to anyone
- Purpose
  - Enable the work force to get control of the workplace
  - Enable a error-free process Visual controls build standards into the workplace to:
  - Give warning, stop or prevent abnormalities
    - Monitor performance, SPC, observe trends and consequently implement corrective or preventive actions
  - Visual control of inventory levels
  - Indicate when people need help
  - Mistake-proof the operation(with the help of Poka Yoke – see the presentation on Poka Yoke)



Types of Visual Controls

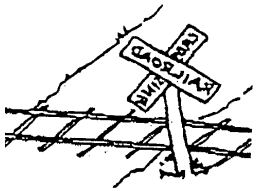
- Production boards
  - Production Summary Boards (Takt Boards)
    - Monitors the output of a process and compares it with the target; takt boards should provide this information:
      - The specific work being done, the desired speed or completion rate, actual completion rate
  - Production Process Boards
    - Used to communicate information about a process improvement initiaitve; these boards should list this information relevant to a specific workplace:
      - Improvement plan, jobs in process, WIP, productivity rates, actual vs. desired lead time and output, problems still to be solved (by whom)
  - Dashboard Metrics
    - Can be used at either the workgroup level or general level. Metrics should be confined to the relevant few and to those things that the organizational and its people can really do something about. Potential metrics at the workgroup level would include:
      - Rolled throughput yield (RTY), on-time delivery, weekly takt rate average, equipment uptime/downtime, unscheduled maintenance time, productivity, sigma level, first time throughput (FTT)
- Andon
- SPC sheets
- Other visual process controls: timesheets, workload checksheets

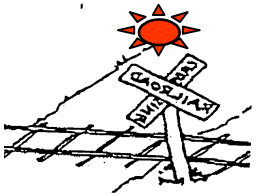
Characteristics of Visual Controls

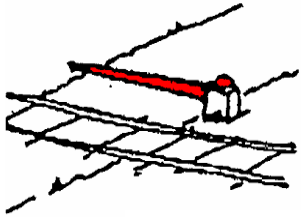
- Simplicity
  - A visual control should give only a single non-ambiguous and simple message
    - Question: How easy is to learn the visual language by a person who is not deaf?
- Unexpectedness
  - A visual control needs not to provide continuous or even frequently repeated inputs, as to be really effective
    - Question: Who goes outside when hears a car alarm in the parking outside the building?
  - An effective visual control is when the operator takes action every time, even if it is a “false alarm”, but immediately followed by the problem solving process
- Concreteness:
  - It is needed a very clear link between common understanding and the meaning of the visual controls.
    - Question: Would it be easy to change the traffic lights from green-yellow-red to yellow-blue-white (if the second sequence has the same meaning as the first one)?
- Credibility:
  - It has to be a clear relation between urgency and gravity and the visual control warning level.
    - Question: If the temperature of an engine is increasing, is it the same to be increase by a degree per minute or a degree per three minutes?
- Persuasiveness
  - How should a visual control induce action? Is it enough to post a few words of warning on a wall or it is better to have an animated LCD panel?

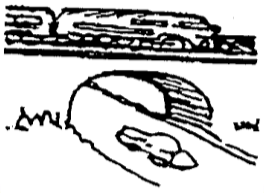
Levels of Visual Controls

- A visual control ranges from:
  - A. Passive control
    - Passively shares information by indicating or telling it
    - Example: a warning poster, a stop sign, a marking on the floor
  - B. Assertive control
    - Sends information by first catching attention
    - Example: an alarm clock, Andon lights, Kanban cards
  - C. Aggressive control
    - Sends information and limits responses
    - Example: a speed limiting device, Kanban areas, barriers
  - D. Absolute control
    - Ensures only the right thing will happen, eliminates the risks
    - Example: different-size mail slots, sensors, automatic devices

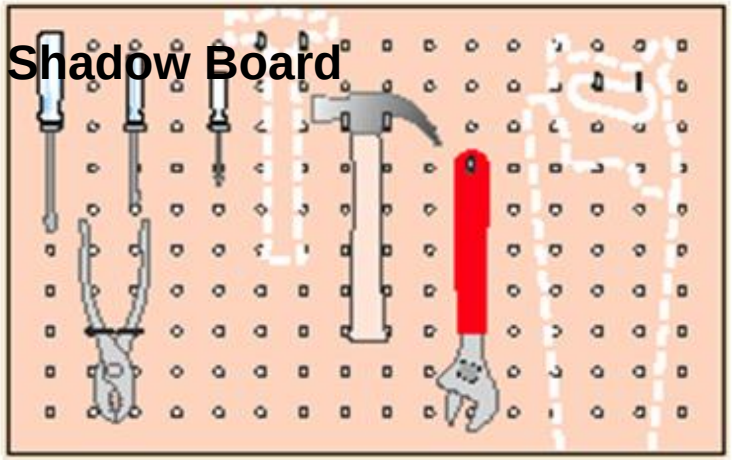


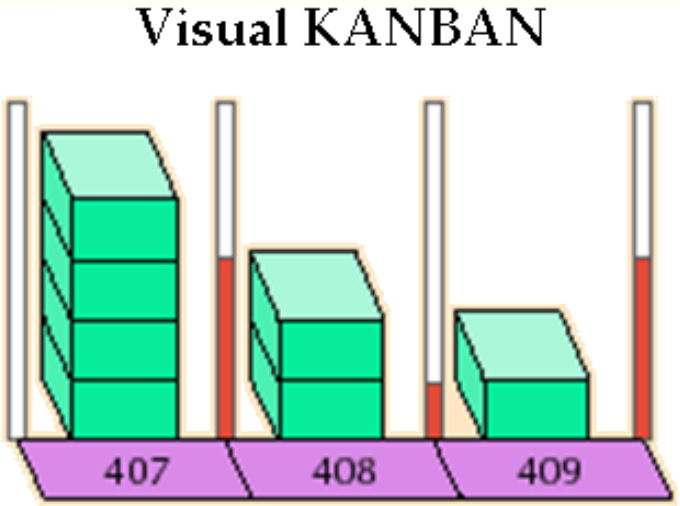






Example – Visual Controls

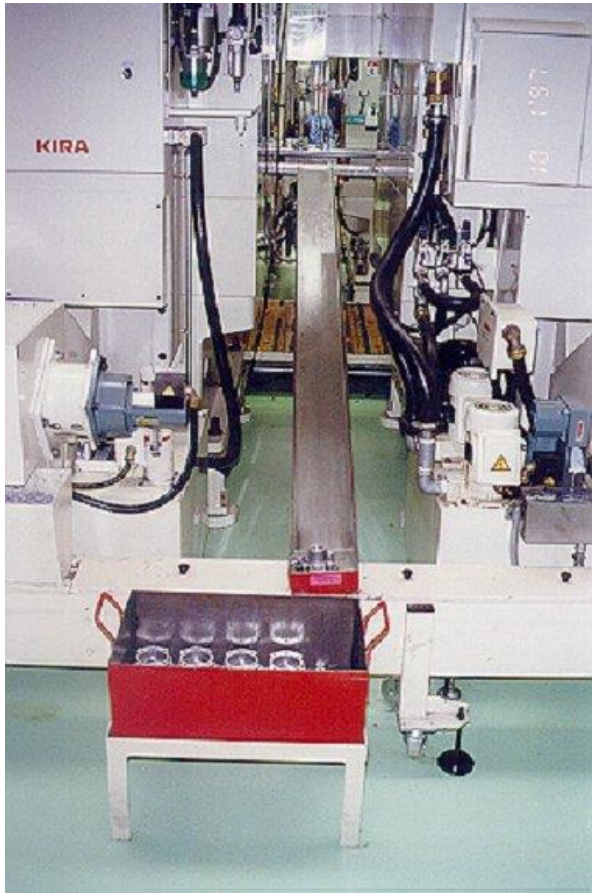




Example - Visual Controls (2)

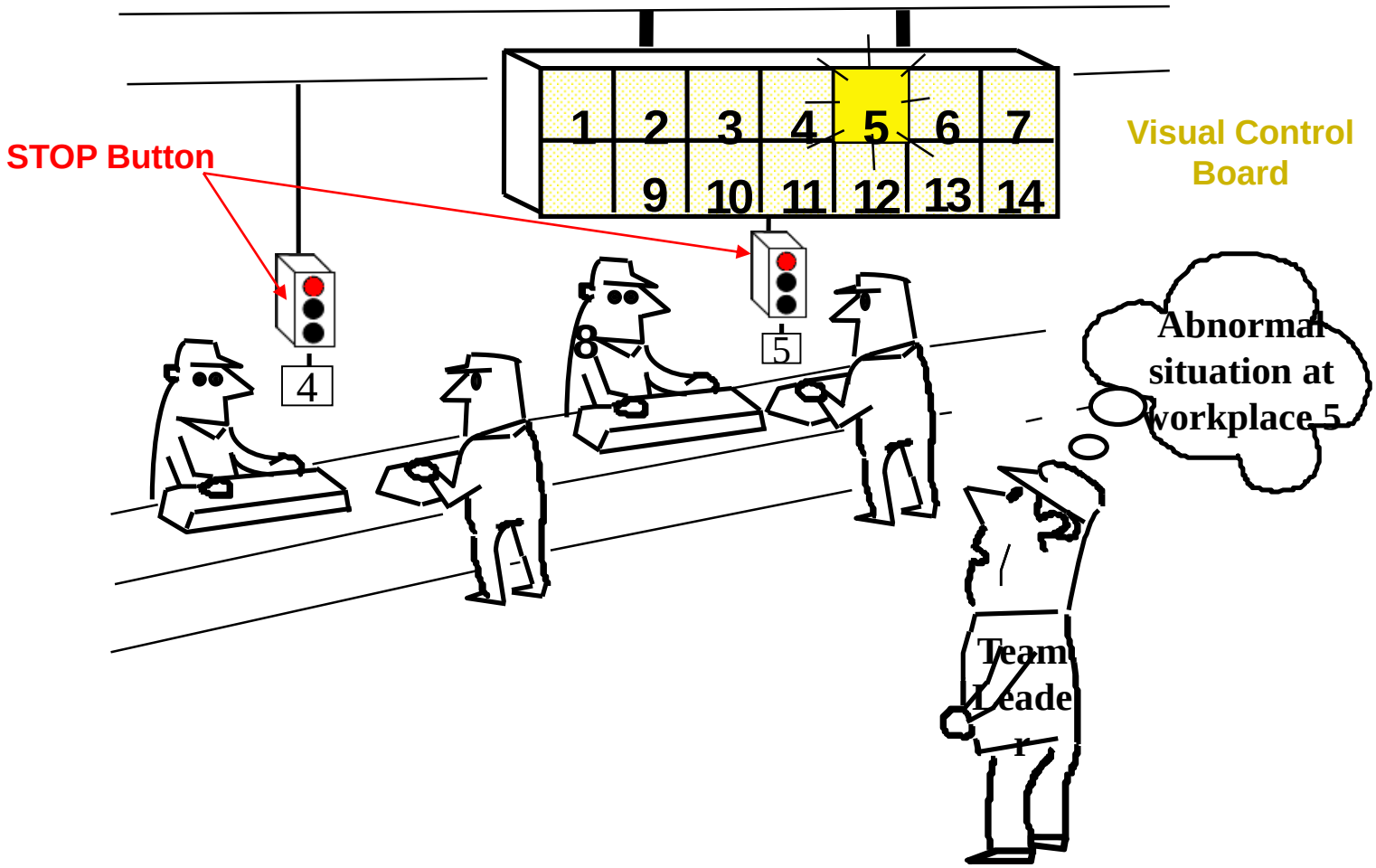
- Standard: “Please clean the room before your departure!”
- Frequency: whenever necessary

Example - Visual Controls (3)

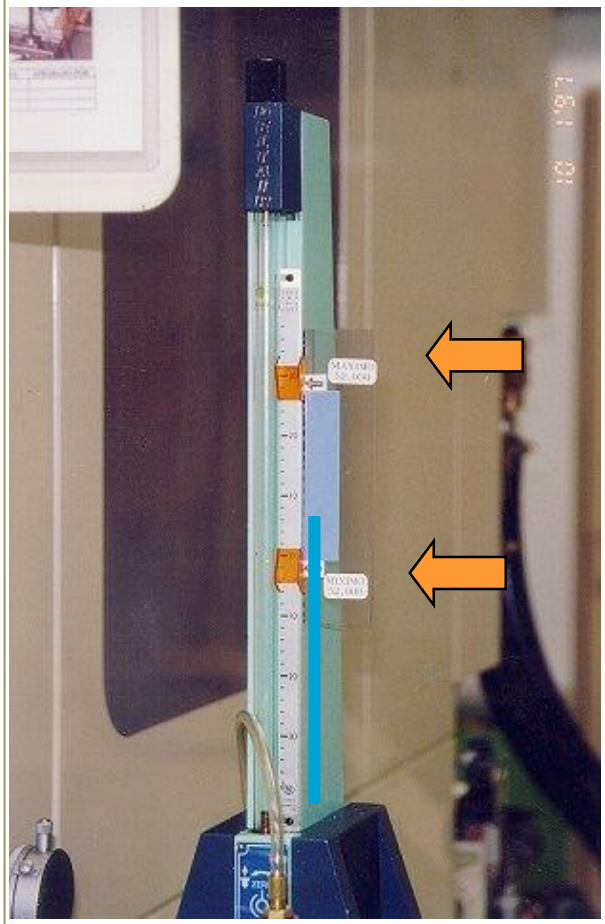


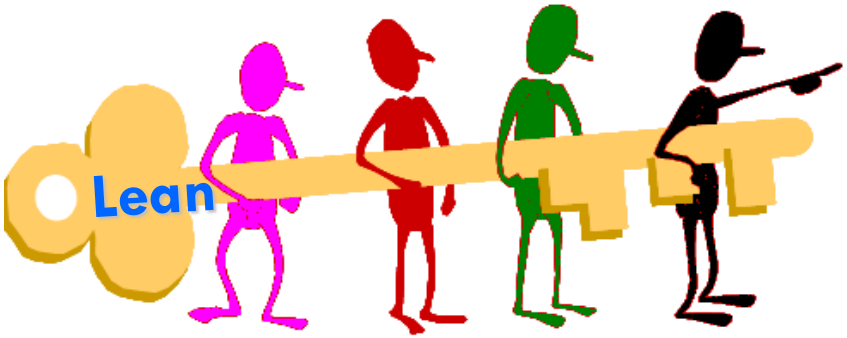
- Red box for non-conforming products
  - Control rule:
    - For a normal situation, the box should contain no more than 6 products in total or less than 3 similar products
      - If YES, production may continue
      - If NO, production should stop, to find and apply corrective actions

Example - Visual Controls (4)



Example - Visual Controls (5)

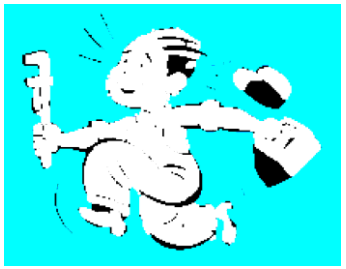




- Usually some visual displays are mixed with visual controls
- Visual control means more than just rules posted on boards
  - It requires discipline, non-blaming environment, lean behaviours

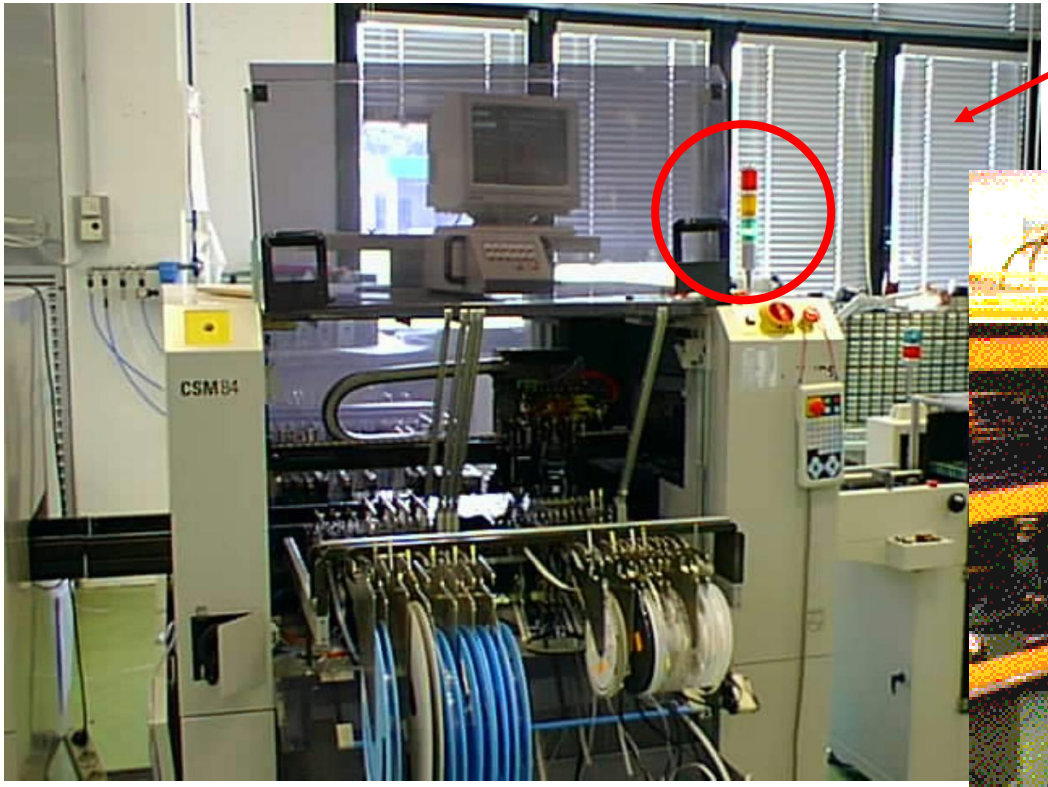
ANDON System

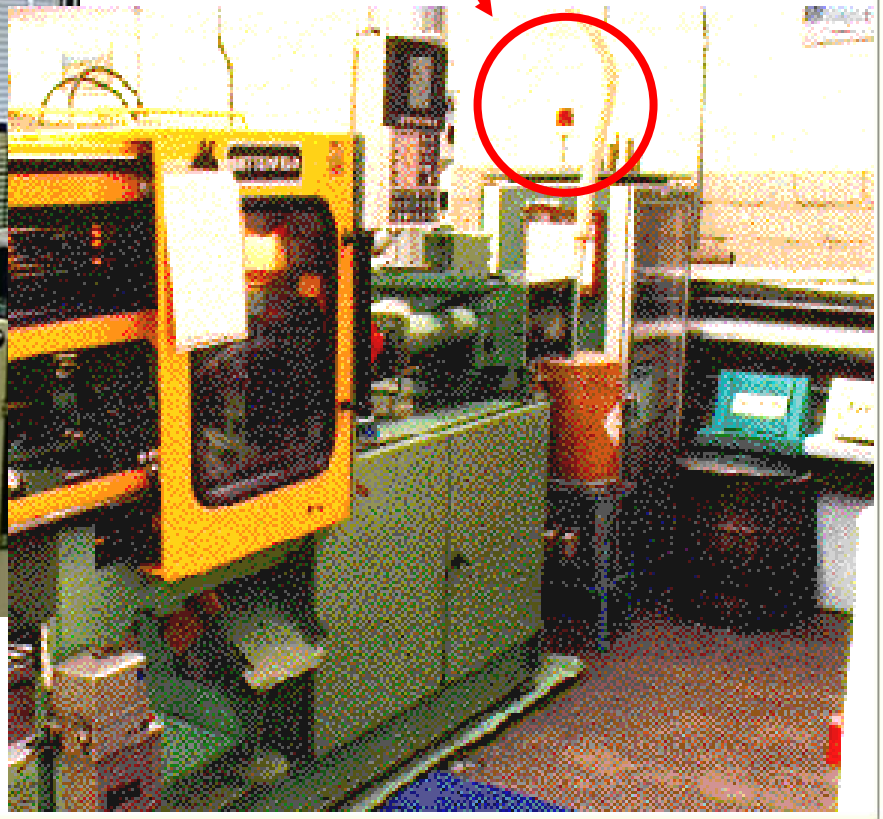
- Andon: A visual control device in a production area, using a light signal to provide information on the current status of the production system.
  - When abnormalities occur, the Andons (alarm lamps) immediately alert supervisors to take charge of the problem



Example - Andon

Andon Lamps





Example – Andon (2)

Andon-type panels

Andon

- Andon is a Japanese term
  - A warning light on a production or an assembly line, that light up when a defect occurs.
  - When the light is on, the equipment or the assembly line is usually stopped until the problem is diagnosed and corrected.

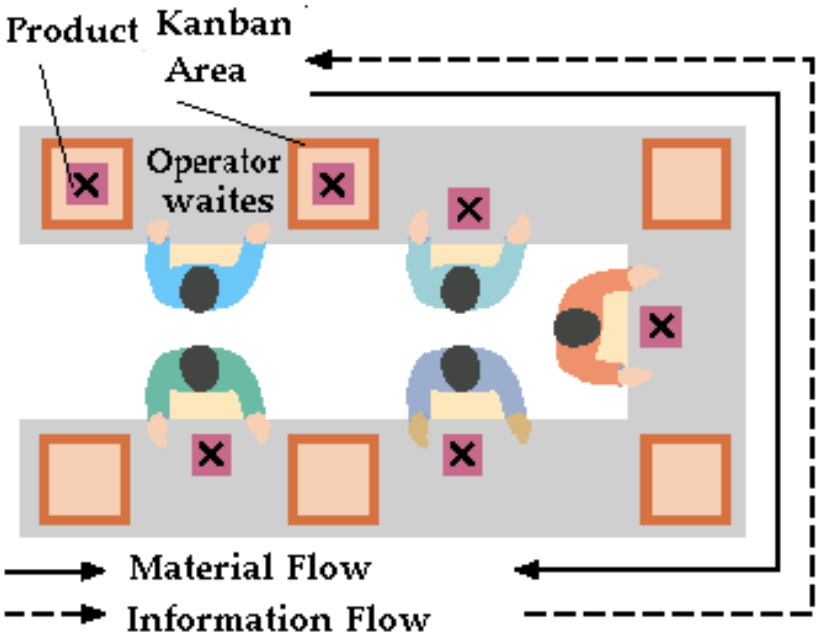
- Benefits
  - It draws immediate attention to problems as they occur in the manufacturing process
  - It provides a simple and consistent mechanism for communicating information on the plant floor
  - It encourages immediate reaction to quality, down time, and safety problems
  - It improves the accountability of operators by increasing their responsibility for “good” production and empowering them to take action when problems occur
  - It improves the ability of supervisors to quickly identify and resolve manufacturing issues

Kanban Cards

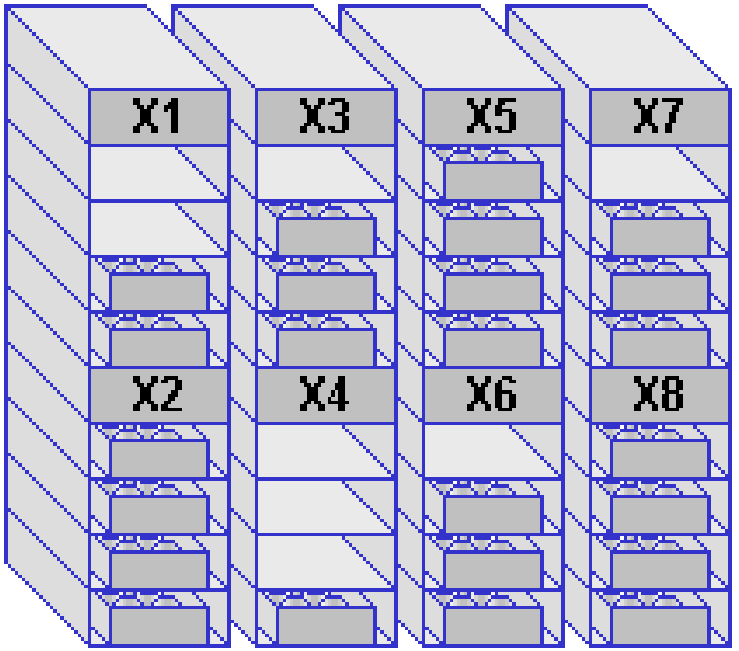
- The Kanban system is a visual control system of material at the factory floor
  - The Kanban cards control the flow of production and inventory.
- There are more Kanban systems, based on the same principle:
  - Production (activity) at the upstream flow workplace is released by the visual information provided by the downstream workplace

Example - Kanban

Kanban Areas



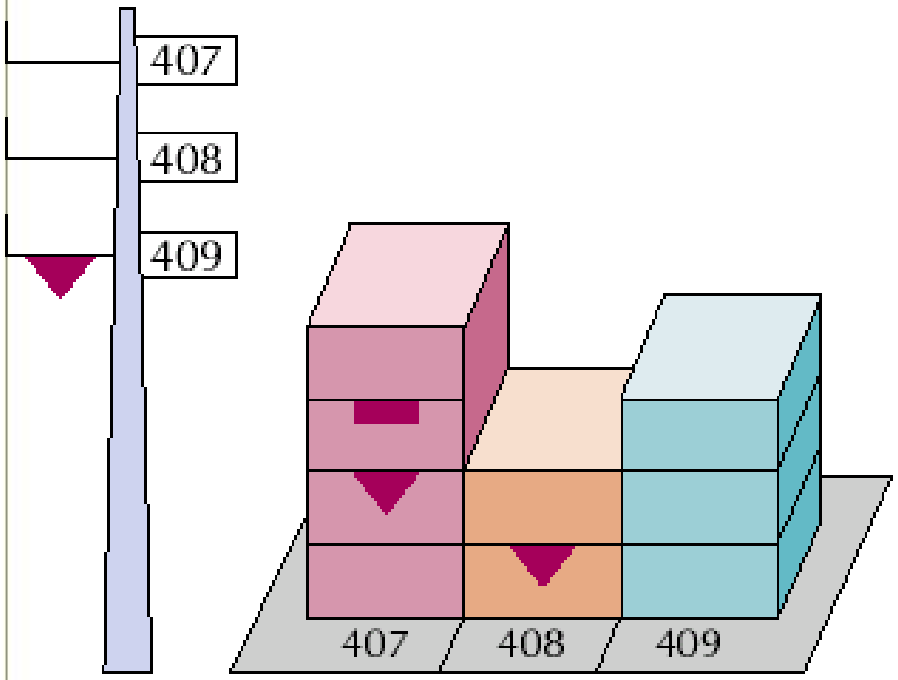
Kanban Shelves



Source: LEI

Example – Kanban (2)

Kanban Signal



Kanban Wall

65	66	67	68	69	70	71
72	73	74	75	76	77	78
79	80	81	82	83	84	85
86	87	88	89	90	91	92
93	94	95	96	97	98	99
100	101	102	103	104	105	106
107	108	109	110	111	112	113
114	115	116	117	118	119	120

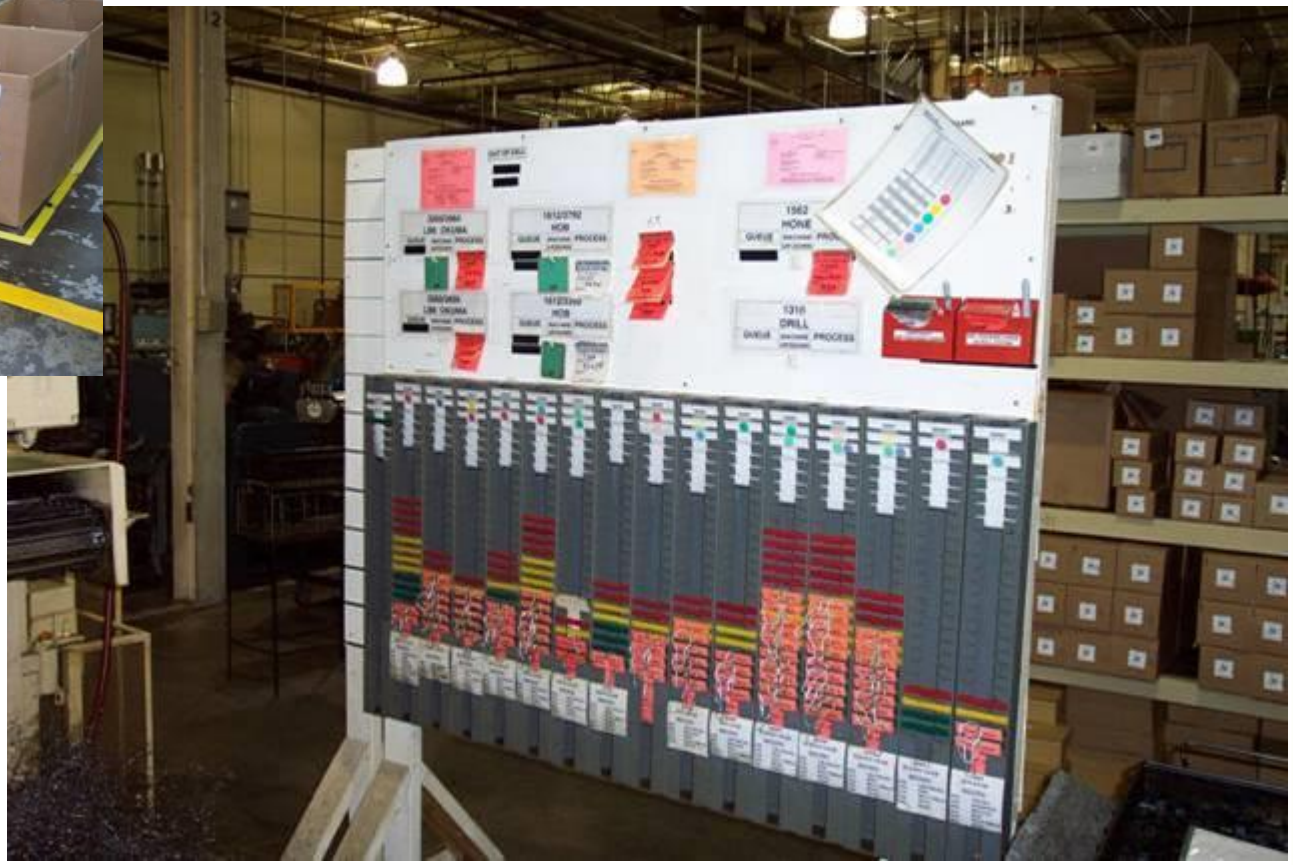
Source: LEI

Example – Kanban (3)

Source: Seamless Textiles, Humacao, PR

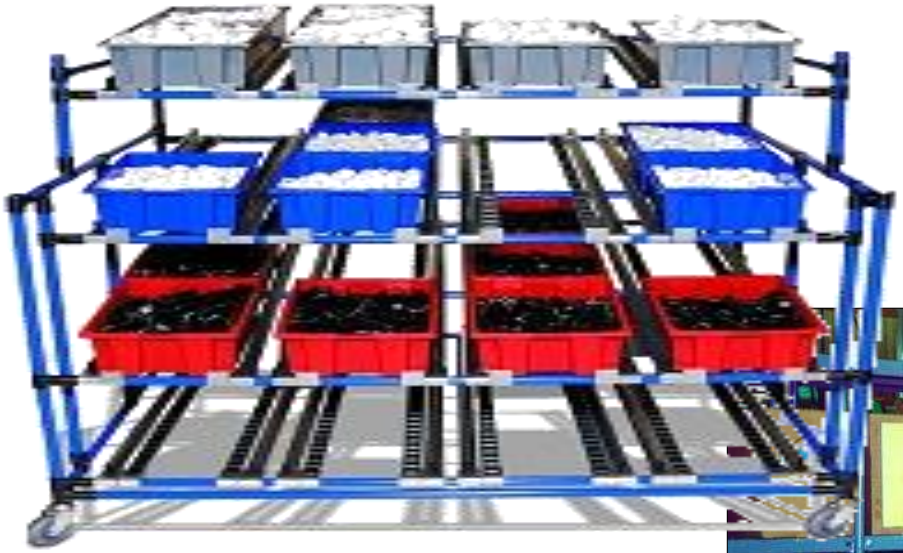
Kanban Area

Kanban Wall



Source: Ingersoll-Rand Co., Southern Pines, NC

Example – Kanban (4)



Kanban Shelves

Example – Kanban (5)

Steps for Visual Control Development

- Look at the workplace as you would see it for the first time, or act like a mere neophyte and try to answer the following questions:
  - Who and what has to know what's happening?
  - What conditions should exist to have 100% good results?
  - What work methods and instructions arte needed as to obtain 100% good results? Where to put the instructions? Are they readable and easy to be understood (short sentences, many images and diagrams, etc.)? Are there needed any visible markings, limits, directions, sequences, etc.?
  - What needs to happen and what needs not to happen? How will the operator know if something is missing from the workplace? Is it everything easily reachable?
  - How is it possible to know immediately if something abnormal has appeared? Is it possible to use colours and charts? Are they easy to be understood? How often do they need updating?
  - How one may know if the obtained results are good?
  - If needed, who, how and when has to come and help the operator?
  - Is it possible to understand the situation without speaking with anyone?

4. Visual Management

Visual Workplace

- The visual workplace needs having a work environment that is self-explaining
  - It easy to see what the standard conditions should be and what the current actual conditions are, and if there are any gaps between the two sets of conditions.
  - It is about
    - Information sharing
    - Deliver the right information to the right people at the right time to influence or drive the right actions
- The visual factory needs to set and display targets for continuous improvement actions.

Visual Management

- Aims:
  - To support people to understand if everything goes well
  - To clarify and see the problems
  - To monitor targets and improvement priorities
- If you can't walk a plant and understand the product flow and operations immediately, then the plant can't be run properly. (Noel Goutard, Valeo SA)

Visual Factory

- Definition
  - An operational philosophy based on fast access to information for making effective decisions
    - Organize, Standardize, Communicate
- Tools
  - Visual layout
  - Production control boards
  - Shadow boards
  - Colour coded bins for scrap, rework
  - Warning horns, lights
  - Inventory control cards
- Examples
  - Workstations identified
  - Exit and caution signs, fire extinguishers, emergency procedures visible
  - Part racks and drop areas identified
  - Lines to distinguish work areas, aisles
  - Containers labelled and accessible
  - Equipment operating procedures visible
  - TPM charts display maintenance of machinery
  - Quality check sheets and productivity data sheets filled out
  - Operation standards and process flow mapped out at each station
  - Process control boards visible and updated
  - Etc.

Example - Visual Management

Don't!

Do!

Example - Visual Management (2)

- Japanese sticker used to alert people to critically important items

Visual Management

- Tools for visual management
  - Kaizen
    - At operational level
    - At top management level
  - Gemba visits
  - Work standards
  - Training
  - 5S
  - Visual displays
  - Visual metrics
  - Visual controls

Tool	Level of people involved
Gemba visits	Directors, top management
Visual displays	Managers
5S, visual controls	Team leaders, operators
Improvement suggestion box	Operators

Conclusions

Some Recommendations for Visual Management

- Take care at visual displays
  - It is not always needed to use permanent methods
    - Sometimes it is too difficult to change them
  - Don’t use more signs than necessary or confusing ones

Some Recommendations for Visual Management (2)

- Give up to closed or locked storerooms
  - Easy access
  - Easy inventory level monitoring

Some Recommendations for Visual Management (2)

- Discourage individual initiatives of “customising” the workplaces along a process flow
  - The workplace should be also operational even if the “owner” is not available for a certain amount of time

Some Recommendations for Visual Management (3)

- State clear rules, communicate them and continuously check if they are followed
  - Don't let survive the idea "live and let live" for people at workplaces along a process flow
    - Use posters, slogans, meetings, rewards, etc.

Success Factors in Visual Management

- A team is needed to analyze and select the visual metrics and to develop the visual displays
  - Visual displays may have different objectives and layouts for different departments, but they must lead to visual control and visual management
  - Each board should be specific for a certain workplace, providing information on the process and on the performances, compared with targets
- The selected process metrics should show clearly the situation and the evolution trends
  - Only relevant information, which adds value, should be communicated, not all available data at a certain moment
- Colour coding system is recommendable in every situation
  - Often it is more eye-catching than complex software outputs
- Whenever possible, visual management should include also client and supplier organisations
  - It is possible to visualize critical paths, bottlenecks; decision making process becomes more objective, as it is based more on facts than on intuition and opinions
  - For internal clients / suppliers chains, visual management assures better cooperation and more efficient use of resources, based on actual performance survey

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