

Kaizen

Standard Operations

Standardised Operations

Operations safely carried out with all tasks organised in the best known sequence and by using the most effective combination of resources.

Resources

- people, materials, methods, machines

Conditions

- Consistent and repeated operations
- Operations adjusted for human ease and effectiveness
- Equipment and resources well maintained

Std Ops eliminate human work waste to...



...ensure the effectiveness and increase the efficiency of human work

Effectiveness:

obtain the desired results

Efficiency:

obtain the results in an "economical" manner


Standard Work Objective

- Eliminate waste related to

- the flow of material

- machine work

- and human work

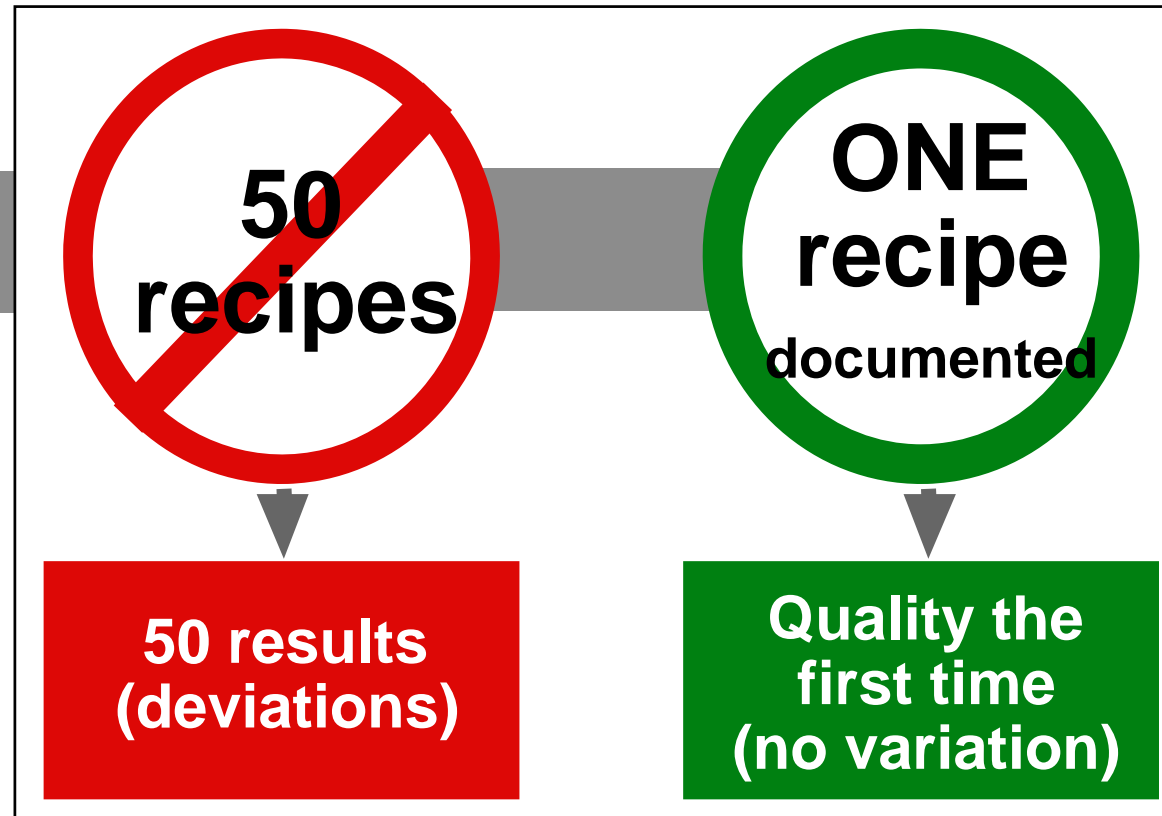


This is the objective of
"STANDARD WORK"

Waste from no standardisation



Deviations and Proliferations



Document human work



- Complete
 - Simple
 - Visual
- Document the line
 - Document the operator's work
 - Document the operations:
 - * work sequence, work contents (**safety** notices, **quality** norms, etc.)

= a unique recipe
= a training tool
= an improvement tool

Constructing a Std Op



1. ANALYSE THE JOB (OPERATION ANALYSIS):-

Do the job and write down a details blow-by-blow account of the activities performed; manual, visual, mental etc., including all steps necessary to guarantee quality, efficiency and safety. If there are different way of doing the job, all are analysed.

2. IMPROVE TO GENERATE THE BEST CURRENT METHOD:-

Think over these steps:

- How can the job be made easier or quicker.
- How can we make it difficult to get wrong (Quality and Safety).

Then write in any improvements.

3. CONFIRM THE METHOD (A):-

Try out the improved method, to check that it is quicker/easier and that quality standards are met. Correct any errors or sections left out.

4. DIVIDE INTO MAIN STEPS:-

Summarise and write the main stages of the job.

Describe each stage or Main step in a brief and straightforward way; What you do, to what? with what?

5. IDENTIFY THE KEY POINTS:-

For each Main Step, write in the subtle 'tricks' of the job which ensure that quality, safety and efficiency requirements are met.

6. CONFIRM THE METHOD (B):-

Try out the method again, just following the Main Steps and Key Points to be sure that they are, by themselves, sufficient to perform the task correctly. Correct any errors or sections left out.

7. COMPLETION:-

Add sketches and diagrams where helpful or necessary and details such as tooling, tolerances, protective clothing, training notes, etc.



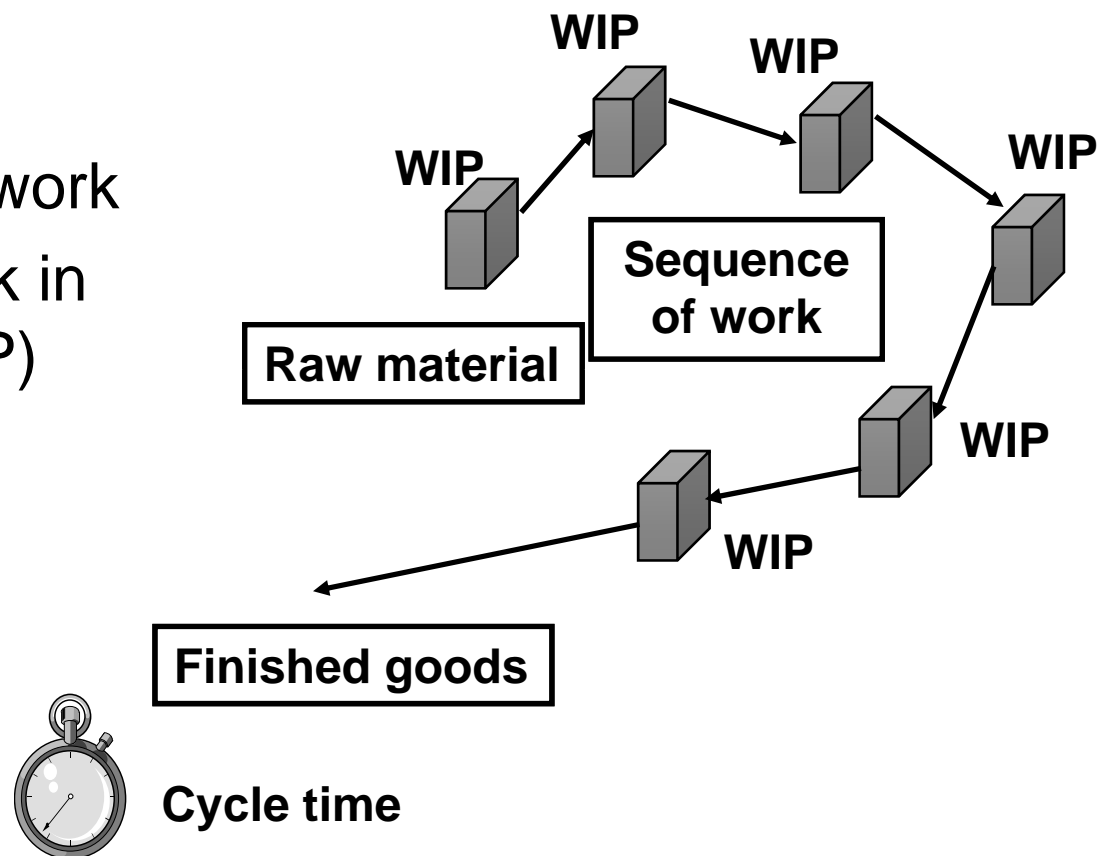
Why Standardised Operations ?



- They are a basis for continuous improvement.
- Visually provide useful information for the shopfloor via a Standard Operation Sheet.
- Promotes ownership by being drawn up by shopfloor people.
- Promotes root cause problem solving directly on the shop floor.

Three Elements of Standard Work

- Cycle time
- Sequence of work
- Standard work in progress (WIP)



Determine the standard work-in-process



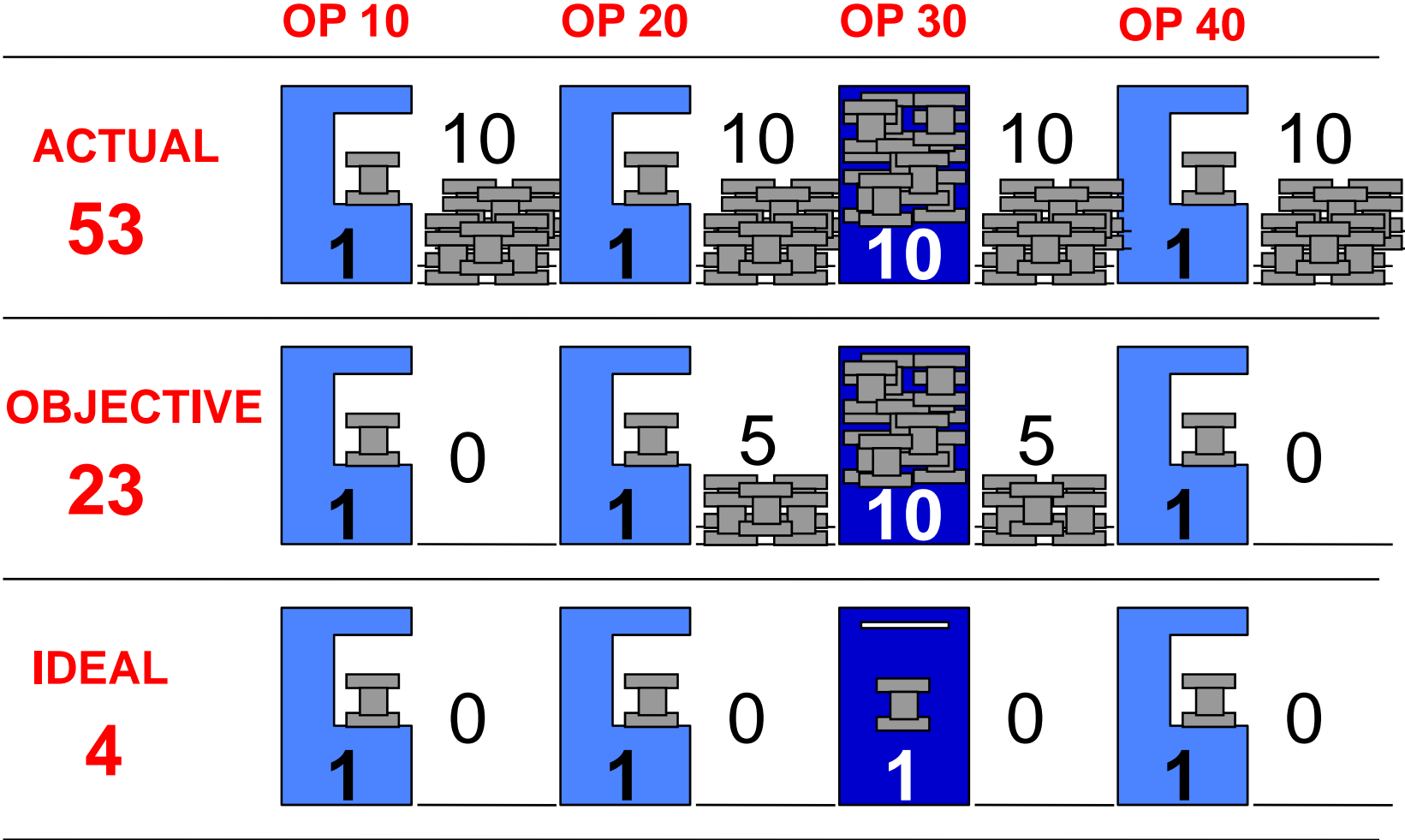
Minimum quantity of parts in-process for a continuous flow of operations

Ideally: 1 part per step of the process

Reality: optimal batch based on

- reject forecast
- machine stoppage forecast
- rhythmical machine capacity (flow)
- set-up time
- etc.

Calculate the standard work-in process



Information Content



METHOD		Operation flow chart Operation description
MATERIAL		Part numbers Locations Stock in process
EQUIPMENT		Equipment identification Location
TOOLING		Tool identification Description
QUALITY		Quality check operations Care points
SAFETY		Safety operations Safety devices to be used
TIME		Customer cycle time Process Cycle time

Standard Operation Sheet



STANDARD OPERATION SHEET

```

graph TD
    A[SUPPORT PLATE] --> B[WELD M/C]
    B --> C[REINFORCEMENT PLATE]
    C --> D[WELD M/C]
    D --> E[FIXTURE]
    E --> F[WIP]
    F --> A
            
```

GET SUPPORT PLATE

PLACE PLATE IN WELD M/C, GET NUT, PLACE IN WELD M/C. GET ASSY.

GET REINFORCEMENT PLATE

PLACE ASSY & REINF. IN FIXTURE & CLAMP

SPOT WELD (2)

REPLACE FIXTURE AND UNCLAMP, LIFT OUT ASSY PUT IN CONTAINER. RETURN TO START

WIP	CUST CYCLE	CELL CYCLE	SAFETY CHECK
10	65 SECS	36 SECS	WEAR SAFETY EQUIPMENT

Wheel Change Exercise

Wheel Change



1. Open boot and obtain jack.
2. Jack up car.
3. Obtain brace from boot.
4. Remove hubcap with brace end.
5. Remove wheel nuts and aside.
6. Remove wheel and place in boot.
7. Unclip spare wheel retainer.
8. Life out spare and place on hub.
9. Pick up wheel nuts in RH.
10. Simultaneously hold wheel in place with LH.
11. and start nuts on studs with RH.
12. Tighten nuts with brace.
13. Replace hubcap.
14. Lower jack and remove from car.
15. Replace brace in boot.
16. Place wheel in well and clip retainer.
17. Close boot.

IDENTIFY THE KEY POINTS:-	NO:	MAIN STEPS
<ol style="list-style-type: none"> 1. Open drivers door, check handbrake is fully engaged by lifting lever. 2. Lift boot lock lever until is felt to open. 3. Walk to boot and open lid. 4. Press spare wheel hard to confirm it is inflated. 5. Unclip wheel retainer. 6. Lay wheel flat on boot floor and load jack and brace. 7. Lift out wheel, carry to wheel arch, squat and lay wheel on ground right of wheel arch. 	1	<p>ENSURE HANDBRAKE IS ON</p> <p>PRESS SPARE TO ENSURE INFLATED</p> <p>CARRY TOOLS TO WHEEL</p>
<ol style="list-style-type: none"> 8. Use flat end of brace lever to prise off hub cap, aside hub cap, concave surface up. 9. Slacken wheel nuts off 2 full turns with brace, aside brace. 10. Engage top end of jack to nearest jacking point, ensure lower end is on flat surface and jack is vertical. 11. Turn jack handle clockwise until wheel is about 2” clear of ground. 12. Pick up brace and place nuts in hub cap. 13. Aside brace and place nuts in hub cap. 14. Using both hands, lift wheel off studs and rest against panel to left of wheel arch. 	2	<p>SLACKEN NUTS TWO TURNS BEFORE RAISING CAR</p> <p>ENGAGE JACK AS ILLUSTRATED AT NEAREST POINT</p> <p>RAISE WHEEL 2” CLEAR OF GROUND</p> <p>PLACE NUTS IN HUBCAP</p>
<ol style="list-style-type: none"> 15. PU spare wheel, align with studs and place on hub. 16. Holding wheel on hub RH, LH pick up nuts and start on threads top first, then bottom, fitting bevelled end of nuts towards hub. 17. Simultaneously LH fit remaining nuts, RH. PU brace and run nuts to hub in sequence shown. Leave brace on final nut. 18. Turn jack handle anti clockwise to lower car. Remove jack. 19. Using both hands fully tighten all nuts in reverse sequence (4 3 2 1). 	3	<p>USE BOTH HANDS TO FIT NUTS</p> <p>FIT BEVELLED END OF NUT TO HUB</p> <p>TIGHTEN IN SEQUENCE ILLUSTRATED</p>
<ol style="list-style-type: none"> 20. PU jack, walk to boot and aside jack and brace. 21. Walk back, PU hub cap and centralise over retaining clips on wheel. Push home firmly confirming OK condition by click of clips and even gap between hub cap and wheel profile. 22. PU spare wheel, carry to boot and place in wheel well. 23. Clip spare wheel retainer in place; close boot. 	4	<p>CENTRALISE CAP OVER CLIPS BEFORE PUSHING ON</p> <p>CLIP SPARE IN WHEEL WELL</p>