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# **The New Turnaround**

## **A Breakthrough for People, Profits and Change**

**By**

**Leonard Bertain**

...his people were an undeclared asset of the corporation, and training the people only increases the value of that asset.

If you focus on profit alone, you're going to make the wrong decision. You have to focus on profitability."

$$\text{Profitability} + \frac{\text{Profit}}{\text{Efficient Use of Assets}}$$

$$\text{Productivity} = \frac{\text{Revenue} - \text{Costs}}{\text{Wastes} + \text{Building \& Equipment} + \text{A/R} + \text{Cash}} \\ \text{Efficiency of Use}$$

"And by wastes, I mean everything that you do in the system that doesn't add value.

You currently spend about 35% of your shop time on setups; I'm telling you that you can't afford not to bring that number under control.

You need to look at all the items that contribute to improved profitability, which includes the rate at which you convert ideas and raw materials to cash and the elimination of waste in your operations.

The total costs to break even, say, on a month-to-month basis, divided by the total number of hours worked by everyone that month.

## TIME

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Product  
starts  
process

Product  
completed

Money  
Collected

...if you come up with an idea that saves the company time, everyone benefits. You will all see it in your paycheck because John's agreed that if you help him improve the company's position, you will see it in raises and bonuses.

Your people spent about thirty hours in fixing the pumps. You also lost three hours when the driver went into town to get the parts you needed. That's a total of thirty-three hours. At \$25 an hour that comes to \$825. That's a substantial amount of money. That's more than any profit potential generated by that order.

"Waste! You see that? You lost \$825 on just one order.

I want you all to think about this first problem we encountered and see if you can come up with any solutions. Remember, the simpler, the better."

1. To think for yourselves
2. To take responsibility for your own jobs
3. To learn to work with each other as a team.

Our class alone had now come up with seventy different wastes.

Waste of:

1. no having the right tools (inspection and processing)
2. inspection
3. mishandling—damage, dings and scratches
4. handling
5. over-finishing
6. looking for misplaced items
7. shift change

8. not knowing next job
9. looking for time card
10. bad plating process
11. generating wasted paperwork
12. repeating verbal order that wasn't written down
13. not having knowledge of available tools
14. pathways through shop
15. waiting for next job
16. not having setup ready—manual & CNC
17. noting having materials with job
18. cleaning work area left dirty
19. waiting for instructions & waiting for manager
20. too many meetings
21. cleaning up after previous shift
22. not documenting change of setup
23. scrap and rework
24. waiting for first articles
25. running to tool store
26. looking for traveler
27. not putting tools away
28. maintenance being done by machinists
29. not using machines to their capabilities (run 35% to 70%)
30. making phone calls
31. waiting for engineering change
32. setup (optimum setup time is zero)
33. idle machines
34. going for coffee
35. looking for carts
36. cramped, inefficient shop layout
37. loading parts
38. leaving machines on
39. timekeeping (twenty minutes per person)
40. lack of leadership (many opinions on job problem resolution)
41. not enough tooling material
42. not having fixtures for all jobs
43. inadequate tool magazine capacity
44. waiting for tools
45. delivering parts to clients
46. moving WIP work around shop
47. bad planning for meetings (beginning & end of day)
48. having payroll clerk
49. supervisors
50. waiting for/sharing inspection equipment
51. having preliminary production job from main shop
52. carrying inventory
53. one computer per machine

54. having to move things to get to work area
55. loading parts by hand (too heavy and dangerous)
56. carrying bar stock by hand
57. looking for tools
58. having band saw a distance from production
59. machining parts to tighter tolerances than required
60. crashing tools
61. putting unqualified people on jobs
62. over-deburring
63. deburring at machine & deburring later
64. repairing the tumbler
65. rushing other workers
66. electrical outlets and hoses in wrong places (too short)
67. omissions of what's controlled on tooling sheets
69. lost creativity due to stress
70. doing work out of sequence.

What was great about this chart was that it allowed everyone to see the whole system. We could really see the inefficiency of it. We could see all those things that we do that don't add value.

“but we expect everyone's job to change. Some people will be doing jobs that are a lot different than their current ones. That I will guarantee.”

“Let me ask you a question, Buck. How do you know that you've done a good job today? At the end of the day, how do you know?”

Yes/No charts tell us when we need to modify a behavior.

Day                                    1 2 3 4 5 6 7 8 9 10

Did the truck leave on time? X X 0 0 0 X . . . .

“A point of control occurs when there exists any person or group that can start or stop production and scheduling.

If you can start a job in your area and Gus can do the same thing, unless you have phenomenal communications between you, you get a problem called multiple points of control. It is called that because more than one person can control a single job.

#1 Priority: A Single Point of Control!!!

The problem lies in the quality inspection before they are trucked to the plater. Last week when this came up.

“Unfortunately, Mike Cain has many duties besides inspection. What I propose is that Mike and a helper come in an hour early to get the inspection done before the plant opens.”

“We will define the aggregate setup like this: We’ll add up the total setup for all the CNC machines each week. We’ll average the last four weeks. If you can cut 1,144 minutes off that weekly total, you win. If you don’t, I win.”

“SMED “ SINGLE MINUTE EXCHANGE OF DIES.

“SMED involves three very simple steps: First, you separate the internal and the external setups. Then you simplify, and finally you optimize. Thee rules of SMED are: 1. separate 2, simplify 3. optimize.

Work sheet

25 minutes to tear down the last job

30 minutes to clean the machine

80 minutes to find the tools and talk with the tool crib manager

80 minutes to set the tool offsets in the holders

15 minutes to find the programmer to load the program

15 minutes to download the program while waiting for the programmer to find the current version of the program to download

30 minutes to find that the program had two bugs in it and then make the corrections.

25 minutes to load all of the tools

20 minutes to find the inspector for the first article  
 30 minutes for first article inspection  
 15 minutes to correct the program and  
 30 minutes for another first article.

“the final inspection was another 30 minutes because the inspector stayed at the station and waited for the part. In all, it took you 450 minutes to do this particular changeover. 420 minutes plus the extra 30 minutes.

“When you look back at that job, how much of the time could have been spent in preparation before the previous job stopped? We call that time external setup time. In other words, external setup is work that can be done while another job is running. Internal setup is analyzing this job, how many of those operations can be moved to external setup? This is what is known as the separation phase of SMED. It is the first step.”

Do you add value to the process?

He doesn't add value. He is necessary support but he doesn't add value.

“Our goal is to design a factory so that the people who add value can keep doing so. When we say that we want them adding value, it means the same as making money for the company. The machinists and assemblers are the only people who can add value.

External Setup		Internal Setup	
		25 minutes	Tear down
		30 minutes	Clean Machine
80 minutes	Find tools		
80 minutes	Set tool offsets		
15 minutes	Find Programmer		
		15 minutes	Load program
		30 minutes	correct program and adjust
		25 minutes	Load tools
		25 minutes	First article
20 minutes	Find inspector		
		30 minutes	First article inspection
		15 minutes	Program correction
		30 minutes	Machine first article again

30 minutes    First article  
                                 inspection  
                                 START JOB

195 MINUTES = TOTAL

255 MINUTES = TOTAL

We call this the separation part of SMED, because you first internal from external setup.

If you let the programmers know you have a job closing down in the next hour, they can plan their work to accommodate you. You can reduce your setup time to a little over four hours. That is a 43% reduction in the setup time by just planning your work more intelligently.

“You can see from the sheet that we haven’t eliminated steps. We have, however, greatly reduced the setup time by simply dividing the work into two groups. Internal setup, that which can only be done when the machine is stopped, and external setup anything and relatively inexpensive machinery, setup was not as critical to plant that can be done outside the machine while it is still running.

In the days of cheap labor and relatively inexpensive machinery, setup was not as critical to plant survival as it is today. Now it can really make the difference between a company making or losing money. It isn’t going to solve all your problems but it lets you breathe a little while you try.

Every solution is tomorrow’s problem as you strive for continuous improvement.

If you reduce the setup time by half, you don’t need to make as many parts as before to break even. I can see that if we needed to make 1000 parts to break even before, we’ll probably need fewer parts now. Maybe, only 500.

“The actual formula to figure the right size to break even is called the economic order quantity or EOQ. So we know that if we reduce setup, we reduce the economic order quantity. We can plug the new setup time into the EOQ equation and you’ll get a good handle on the lot size required to break even.

“The good thing about setup reduction is that if you take an eight-hour setup down to fifteen minutes, then you can make one hundred pieces and still be profitable. You don’t have to make 500 units to fill a 200 unit order. If you don’t have 300 excess, you have nothing to store or count or pay taxes on. By the way, does anyone know the optimum batch size?”

“One.”

“We strive to make setup zero or as close to it as possible. The way you can make one unit at a time. You could be totally responsive to the market and Roland would sure love that.”

“If you could do that, you wouldn’t need big warehouses to store finished goods or WIP. If an hour after a customer called, his product could be in the delivery truck, you wouldn’t need to carry any inventory at all. You would just build it for him right then and there.”

“Not only would you not need a finished-goods warehouse, you also wouldn’t need to keep six months’ worth of raw materials. And those people who’re not adding value to the company by moving and counting that inventory could be given jobs that do add value.

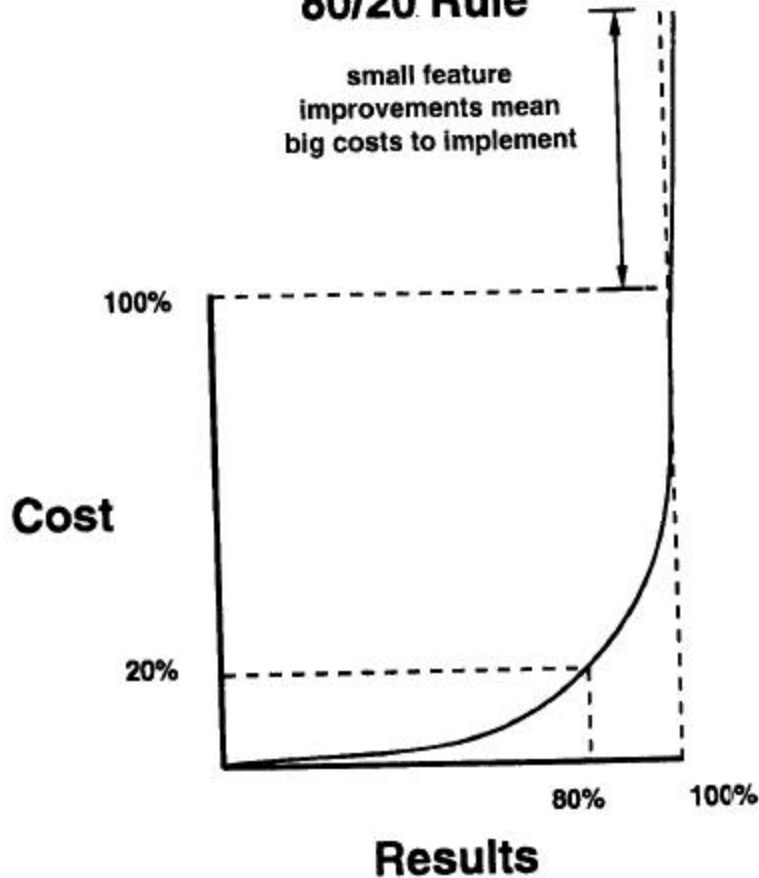
“If we could use this to shorten the time between taking a filling an order, we’d sell many more products. We lose orders because other companies with comparable products can deliver them sooner than e can.”

What if we divided the plant into specific product lines and put the assembly right next to the production machines?



LEONARD BERTAIN

## Pareto Principle 80/20 Rule



“If I identify a waste of \$100,000 and it costs me \$25,000 to buy a piece of equipment to solve the problem, can I spend less money and get rid of any of the waste? It turns out that in almost all cases, we can get rid of 80% of the waste by spending only 20% of what it would cost to eliminate 100% of the waste.

...to solve it by spending only 20% of our recommended costs of implementation.

Maybe you can spend less money and move the solution forward.

In six months, after spending only 20% of the dollars that were projected earlier, you may have a better understanding of the problem and be able to make a more informed decision.

We are trying to show you that there may be any number of ways to get 80% of the way into the solution by spending fewer dollars. And it usually turns out that last 20% is very expensive.

...if I can solve a problem by spending \$20,000 to eliminate \$100,000 of waste, that I could just as well spend \$4,000, and eliminate \$80,000 of waste.

“You know, 80% of my problems comes from 20% of my customers.

80% of my late shipments are caused by 20% of the trucking companies...

What I want to do is start the Productivity Review board tomorrow.

I want it to be the focus of implementing new ideas. I don't want good ideas to drag on before getting implemented.

Talk about the Process Map.

Every time we eliminate one of these lines, Mr. Grimes puts \$1,000 in the kitty.”

World Class Manufacturer: a company that

- utilizes its people to the max,
- has high quality standards,
- uses JIT principles,
- is striving for continuous improvement of its operations,
- and is concerned about the community and the environment.

**The PRB has the following goals and measurements of success:**

1. To monitor the organization's efficiency of processing orders compared to the Process Map developed in Class 1. Every step eliminated from the total of 61 will be documented by the PRB and submitted to Mr. Grimes on the last day of each month.

Each step eliminated will generate \$1,000 for the kitty and will be distributed quarterly to the employees.

2. To receive ideas from employees that recommend elimination of waste. For every idea of waste elimination of \$25,000 or less that is implemented, an employee will be paid a bonus of \$25. For wastes greater than \$25,000 but less than \$100,000 a bonus of \$50 will be paid. For anything over \$100,000 of waste identified and the program for elimination initiated, a minimum bonus of \$100 will be paid with a negotiated bonus for really big wastes. Any idea submitted by one of the established teams will receive triple the bonus noted, with proceeds distributed equally to all team members. The reason for the bonus for team ideas is that some ideas are a group effort and no one person should receive the full credit.

a. All ideas should be submitted on the attached cards, distributed around the shop and available from any member of the PRB.

b. All action on ideas will be responded to weekly with the results of successes posted for all to see. Total accumulated wastes eliminated to date and total payouts will be posted weekly. A report will post; ideas pending, ideas approved but not completed, ideas implemented and bonus paid.

c. There will be situations that arise where an idea will be submitted and the committee thinks it is too close to the normal definition of a job. For instance, if an engineer comes up with the design for a new valve, it will probably not receive an idea award because that is his job. If a machinist comes up with a design, he will be rewarded. The PRB reserves the right to make judgments when there is some question as to the merit of the idea.

3. The chairman of the PRB will be supportive of any implementation of an approved idea. He will commandeer any and all resources needed to get the job completed. The chairman will report directly to Mr. Grimes.

There are three problems associated with the point of control. One of them is multiple points of control.

The second problem is the wrong point of control. The last problem is no point of control.

A wrong point of control, occurs when the control is activated by the wrong person or department.

...the kanban concept of controlling product flow on the shop floor and in assembly. He explained to us that kanban means “to signal” in Japanese.

Kanban was a signal to order a batch of widgets, to make a batch of grommets, or to fill an empty kanban box with nuts or bolts. It was a signal that contained key information about the part. If a series of parts was required to fill the empty box, the kanban order would tell the machinist where the drawings were.

He explained that one of the ways to use an MRP system and a kanban system was in fact pretty clever.

#### 6 Major Systems support Types (Controlled by managers and supervisors)

1. Information
2. Rules and Policies
3. Rewards
4. Time
5. Physical Work Layout
6. Technology.

One. Information. Information is very important. Managers and supervisors usually control the flow of information to their subordinates.

...a worker must know the results of the work as it is performed in order to judge his or her daily performance.

Two. Rules and Policies. ...So the rules and policies have to be examined. And maybe even changed.

Three. Rewards. If we want people to cooperate in teams, then reward them for team behavior.

Four. Time. The main reason time and its control is a systems support issue is that managers must give their employees time to get the work done. Workers need to communicate effectively to work in a team.

Operation	Description	Single Part Cycle Time
10	Kit material for job	1 minute

20	Move pallet to mill Setup job—1 hour Run 300 bodies—16 hours & 54 minutes	3.5 minutes
30	Move to drilling center (if more than 4 pallets at drill area move to staging area) drill and tap—lower body assembly drill—upper body assembly	2.5 minutes 1 minute
40	Move to boring center If more than 6 pallets, move to Staging area	7 minutes
50	Drill valve outlet ports—4 outlet ports	12 minutes
60	Hone Bearing sleeve	1 minute
70	Press bearing into sleeve	5 minutes
80	Move to assembly kitting area	-----
	Total time upper assembly body	26 minutes
	Total time lower assembly body	27.5 minutes

#### 255 MT Cell Layout

If we moved all of these units to this arrangement and don't change a single step in the process we will get phenomenal throughput out of the cell.

You didn't just analyze manufacturing or sales or engineering, you treated them as a system and dealt with that. But is it that simple?

In a way it is. Most consulting approaches isolate one or the other of the departments, and solutions that arise out of those programs are at best patches. By attending to the whole system, everyone is drawn into the process at the same time and singular issues are seen as what they really are, problems with the whole system.

The effort to improve the organization's performance must begin with clarity as to the right work to do. Everything else flows from that revelation. First, determine the way that system works now, then pinpoint the wastes (the activities that add no value) and then mount a campaign to eliminate all waste in the system. As the value-adding process is clarified, the work itself then dictates the roles, tasks, jobs, relationships, and yes, even behavior, that must support the right work.

