

JIT, KAIZEN, TAKT Time Implementation In Manufacturing Company

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Abstract

In Indian economy small-scale industries occupy a significant place, as of their employment potential and their input to total industrial output and trades. Now-a -days this sector faces contests to keep up its made position attributable to struggle of latest competitors each within the national and world market. So, endless improvement is needed to beat these challenges. Hence, ideas like Six sigma, Lean producing, Continuous enhancements, Quality Circles (QCs), Just-in-Time (JIT) area unit gaining quality of late. Lean producing tools aims towards the prime quality, low cost, and simply in time delivery by shortening the assembly flow by eliminating waste. during this paper focus is on implementing Lean producing tools like KAIZEN, JIT, Takt Time. This paper can facilitate practitioners to implement such lean tools in tiny scale industries that is otherwise troublesome to do.

Keywords: *KAIZEN, JIT, Takt Time. small scale industry.*

1. INTRODUCTION

This paper relies on the implementation of few Lean manufacturing tools as mentioned in abstract to boost the productivity and quality of business product. For this purpose, a tiny scale business in Vasai East was elect that is understood as Manish Fasteners. It's been a decade company serving to the industries with specialized and normal fasteners. They provide across numerous states in Asian nation directly and indirectly. They're coming up with for serving automotive and different industries overseas in close to future. There was a good scope for improvement in aforesaid business. Comparison of results is administered with the assistance of before when photos, graphs, sheets, etc.

2. PROBLEM DEFINITION

After visiting Manish fasteners and each department was studied. Their current layout and working procedures were

noted. The aforesaid business was facing issues like quality issue, High work in Progress (WIP) and inventory, failing to satisfy client demands, questions of safety.

3. METHODOLOGY

After learning all machines and procedures on workplace, few machines were elect for improvement. Company have 3 departments viz. Heading , slotting , rolling, In heading head of screw is cold solid then it's sent to slotting department for creating slot on head for driving purpose and finally it's sent to rolling department wherever threads are affected on shank of screws. JIT was enforced within the entire department. KAIZEN was performed on a slotting machine and on a rolling machine. Takt time analysis was administered on one in all the rolling machines.

3.1. JIT employment and results

JIT strives for reducing waste by producing the precise amount asked by the client. By keeping this principle in mind, JIT sheet was created that controlled on-line quality checks and fewer inventories on workplace. As we will see in figure one. This sheet is initial stuffed by production manager which has amount to be factory-made, size, material specifications to be used, in-out time, quality checks throughout producing against expected dimensions etc. antecedently it had been done by means that of verbal communication. Forgetting things is human tendency, in order that amount over expected is solid in heading department. Currently actual amount is factory-made. This sheet is then sent to slotting then to rolling. At every department the sheet is crammed and sent it to next alongside processed product. Quality was checked and rejection was lowered attributable to on-line quality checks. The instant any price deviates from ideal, the machine is stopped and drawback is resolved then solely production starts. Value of makeover and intensive quality review before dispatch was decreased.

HEADER CHECKLIST		
Dt. _____	Time in : _____	Order No. _____
Item name _____	Time out : _____	
Quantity: <input type="text"/>		Wire: _____
Shank Length: <input type="text"/>		
Head thickness: <input type="text"/>		
Head diameter: <input type="text"/>		
Punch is sharp and clear ?	Yes No	
Shank is offset from axis ?	Yes No	
Head is oblong?	Yes No	
Other: _____		
Checked by: _____		Send to : Slotting / Rolling

SLOTING CHECKLIST		
Dt. _____	Time in : _____	Order No. _____
Item name _____	Time out : _____	
Quantity: <input type="text"/>		Cutter: _____
slot width: <input type="text"/>		
slot depth: <input type="text"/>		
slot contains Burr ?	Yes No	
Slot is offset from axis ?	Yes No	
Other: _____		
Checked by: _____		Send to : Rolling

ROLLING CHECKLIST		
Dt. _____	Time in : _____	Order No. _____
Item name _____	Time out : _____	
Quantity: <input type="text"/>		Die: _____
Thread length: <input type="text"/>		
Thread Dia.: <input type="text"/>		
Threads are sharp and clear?	Yes No	
Gauge test pass?	Yes No	
Other: _____		
Checked by: _____		Send to : Quality and Dispatch

Fig no.1 JIT sheet

3.2 KAIZEN employment and results.

KAIZEN was performed on 2 machines viz., S2 (slotting) and R2 (Rolling). Figure a pair of refers to machine S2 before. Figure three refers to when state of affairs. Antecedently there was drawback of splashing of screws when slotting off the flip plate. It's presupposed to come by collector. Then owing to splashing round the flip plate there's additional work to be done i.e. assortment of screws from that chip accumulated space that terribly harmful. Then we have a tendency to come up with plan showed in figure a pair of metal foil is placed vertical ahead of cutter that prevents cooling water and chip to fall on operator. There's one metal wire bend circular as shown to stop the splashing of screw from flip plate. Owing to this wire screws dead come by collector. Therefore owing to this KAIZEN one safety was magnified, wastage, additional labor was reduced.

Fig no.2 before KAIZEN 1

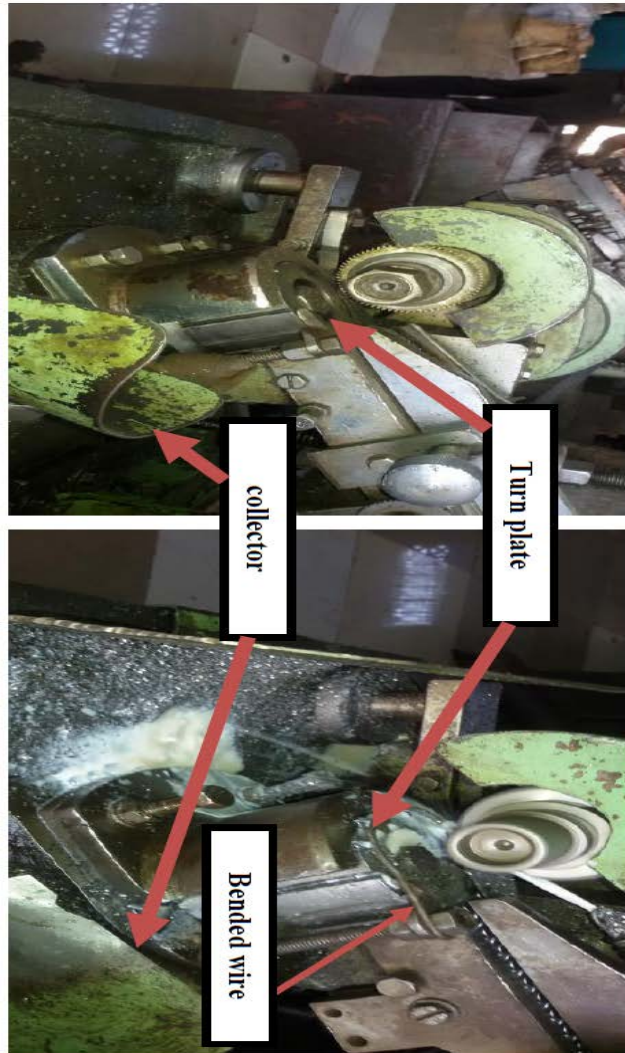


Fig no. 5 after KAIZEN 1

3.3 Takt time employment and results.

“Takt Time is that the most popular time that it takes to form one unit of production yield”. Meaning if our time for production of 1 unit is a smaller amount than or cherish Takt time then client demand are going to be achieved. There was a rolling R1 that was feed manually by employee. The screw that is rib on this machine is 55mm long. Daily client demand for that screw is ten thousand items. There's 10 operating hours i.e.600minutes out of that 30 minutes for lunch, 10minutes for evening snacks, 30minutes for starting setups or changeover. 20 minutes for bio breaks. Net operating hours is 510 min

(660-30-10-30-20).So calculating Takt time as per below formula.

$$\text{Takt time} = \frac{\text{Available Operating Time}}{\text{Customer Demand}}$$

Takt time = $(510 \times 60) / 9000 = 3.40$ seconds. So if we do threading of one screw in 3.40 seconds then only we can fulfill order of 9000 daily. But after observation (Table 1) we find that on an average it takes 4seconds at present so they could deliver max 7650 screws which is not enough

Table 1. Actual time data before

Days	1st day	2nd day	3rd day
A	4.040	4.030	4.005

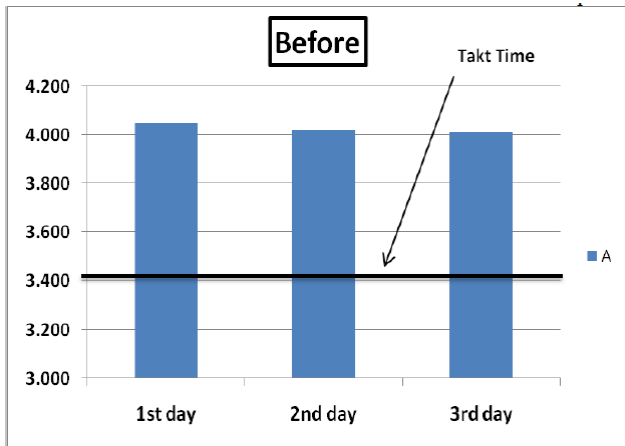


Fig no. 6 before actual time for one screw

So we found three solutions out of which solution-I is to give rewards to worker A to complete order of 9000 screws daily and time was calculated for one piece. Table 2 shows time for employee A for consecutive 3 days. As we can see from graph plotted for same (Figure 6) actual time is more than Takt time.

Table 2. Actual time data after solution I

Days	1st day	2nd day	3rd day
A	4.014	4.010	3.985

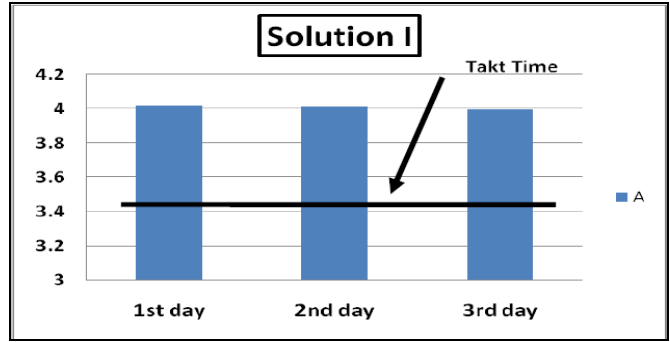


Fig no. 7 after applying solution I actual time

Now Solution-II applied that gave following results (Figure 8 and table 3) .We given constant task to a few completely different staff (A, B, C) work for 3 completely different time periods. Per their amount and, production, we have a tendency to calculate the time and compared with Takt time. Time periods were 9am to 1pm, 1.30pm to 5.30pm and 6pm to 7.30pm. Also for 3 days staff interchanged their time periods. This gave sensible results however target not achieved.

Table 3. Actual time data after solution II

Days	1st day	2nd day	3rd day
order	ABC	BCA	BAC
A	3.980	3.900	3.810
B	4.210	4.250	3.850
C	4.005	3.810	3.990

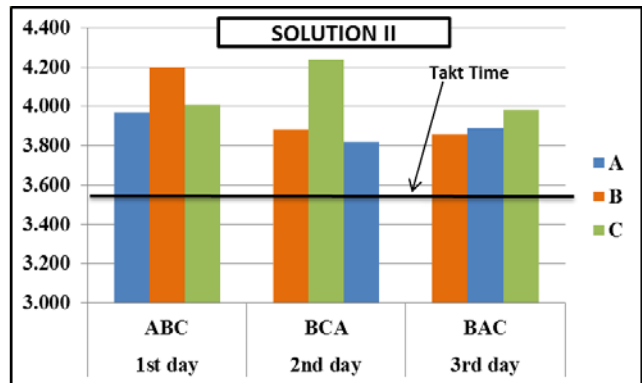


Fig no.8 after applying solution II actual time

Solution III gave the fascinating results. One worker from close machine was asked place to place} all screws so as and put it in receptacle so employee Unit is functioning on machine won't waste time in sorting them in correct order(All heads up).On a mean one sec per piece was wasted to type. This alongside answer II having best worker for acceptable amount were applied and following results are achieved. See Table 4 and figure 9.

Table 4. Actual time data after solution III

Days	1st day	2nd day	3rd day
order	BAC	ABC	BAC
A	3.105	3.110	3.075
B	3.125	3.080	3.115
C	3.390	3.320	3.335

At the end Figure 10 shows the comparison to pick best acceptable combination of result which provides best output. We have a tendency to conclude from here that when applying all the solutions we have a tendency to might deliver the maximum amount as 9952 items. Table five shows norm for all 3 days and 3 solutions are combined in it. Figure 10 shows comparison graph for the same.

Table 5. Comparison table

	1st	2nd	3rd
Before	4.040	4.030	4.005
Solution I	4.014	4.010	3.985
Solution II	4.065	3.986	3.883
Solution III	3.207	3.17	3.175

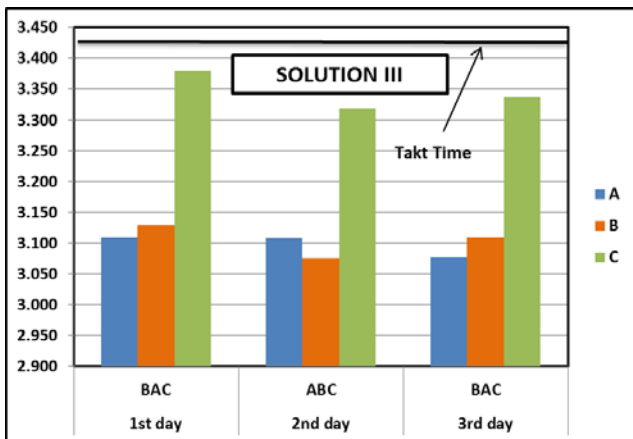


Fig no. 9 after applying solution III actual time

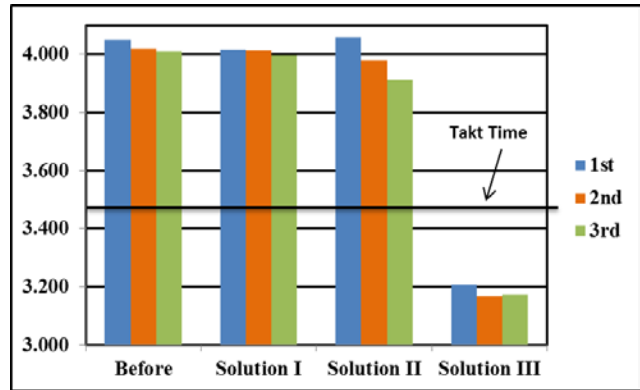


Fig no. 10 Comparison of all solutions

4. CONCLUSION

We conclude that when applying KAIZEN we have a tendency to might minimize labor efforts and magnified safety. JIT sheet was created habit on every machine so quality before needn't to examine intensively. Conjointly the rejection was reduced as a result of various reading were taken throughout production and compared against commonplace dimensions on the spot. It became proof for future new operator for help. Takt Time analysis done was useful to satisfy demand by finding solutions. Antecedently desired time for one piece wasn't even calculated and worked on. Currently it's created mandatory to calculate Takt time each time once new project comes.

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