

PRODUCTION MANAGEMENT IN SME'S INDUSTRY: CASE STUDY OF CV WIRACANA

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ABSTRACT

Production Management is the act of designing, operating, and improving the productive systems – a system for getting the work done. Along the process, the synergy in between machineries, facilities and people could empower the sustainable of the production. In fact, for some cases, the implementation of unique system is needed for the production process. The example for this transformation production management is in the case of CV Wiracana, a handmade manufacturing company for folding hand fans from Bali. CV Wiracana's products are very unique, combined from mass production for the speed and an art for the custom made product. At one side, the market forces them to speed up the production and for this purpose, they must set up the new system on their production line. On the other side, the masterpiece also needs to be produced without jeopardizing mass production line schedule. The transformation production system needs to be done no later than 2015 as the urgency to fulfill the customer demand, business growth, compete in the industry and sustainability. The changes are expected to improve the production at least about 20% or doubled from the current production.

Keywords: *production management, transformation production management, production scheduling*

ABSTRAK

Manajemen produksi adalah merancang, mengoperasikan, dan mengembangkan produktivitas sistem untuk menyelesaikan pekerjaan. Dalam proses ini, sinergi antara mesin, fasilitas, dan manusia dapat mendukung produksi yang berkelanjutan. Pada beberapa kasus, diperlukan implementasi sistem yang unik di dalam proses produksi. Contoh transformasi manajemen produksi adalah pada CV Wirasana, satu perusahaan manufaktur buatan tangan dari kipas lipat Bali. Produk CV Wirasana sangat unik dan merupakan kombinasi dari produksi massal untuk kecepatan, dan seni yang dibuat dengan produk yang dipesan. Di satu sisi, pasar mengharapkan CV Wirasana untuk mempercepat produksi, dan demi memenuhi tujuan ini, maka CV Wirasana harus mempersiapkan sistem baru di dalam barisan produksinya, akan tetapi sebuah karya yang sempurna juga perlu diproduksi tanpa mengganggu jadwal barisan produksi massal. Transformasi sistem produksi ini perlu diselesaikan paling lambat di tahun 2015 karena terdesak permintaan customer, pertumbuhan bisnis, persaingan di industri, dan juga keberlangsungan bisnis untuk jangka panjang. Diharapkan setidaknya produksi dapat ditingkatkan sebesar 20% atau digandakan dari produksi yang sudah berjalan.

Kata kunci: *manajemen produksi, transformasi manajemen produksi, penjadwalan produksi*

INTRODUCTION

Folding fan at the first time were used by Ancient Greece at least at 4th century BC and getting known popular widely to entire European, Egypt, and Middle East and crossed to Asia from China to Japan. The time when it coming from Indonesia is unknown but Rafinson (2012) mentioned that Malay culture, where Riau kingdom dynasty was, invented gold folding fan due to the more widely used of gold at that time. Finally, it is widely used in entire Indonesian after that.

Bali since many years ago has produced many kinds of handicrafts; name it from statue, crafting, painting, vase and many more. One of it is a homemade folding fan. Traditionally, they made it as a home industry in small scale at Sesetan near Denpasar area. The productivity is very low, because it was made as a handmade product. In one week, the traditional maker maybe could only produce one piece of fan. The material was made from wood and fabric. The famous wood that was being used as the material is Cendana in Bahasa Indonesia or it is also known as Sandalwood in English. The business continues slowly but still survives up to now. Many tourists come and bring this folding fan as a souvenir.

Mr. Wiracana's family owns this business too. It started since early 70s, driven by his father name Dewi Amba, the product output was only about 10 fans a day. Starting early 80's, he improved the business and grew it under the flag name Wiracana. With some improvement in machineries and management, it grew fast with significant output from 10 pieces to 1,000 pieces a day (Wiracana, 2014), and they started to export their products to many countries such as Spain, Japan, America, Mexico, Fiji, France, German, Australia, Italia and other countries around South-East Asia.

Talking about the production management implemented by CV Wiracana, the production management transformed from manual, which used many human workers and very traditional way, to modern line in home industry scale which created efficiency and improve their productivity. When CV Wiracana first started to rebuild the business, they struggled on how to fulfill the customer demand. To anticipate the wave, they started to build a modern production line, and they decided to use modification machines for the line. Also using some ICTs tools to help them more efficient in handling their customers, as we believe ICTs could help SMEs in three ways: increase productivity, increase efficiency and connect them to the network locally or globally (Uden, 2007) .Then 60% of their products were produced by machines and the productivity increased very significant, up to 1000 pieces fans a day nowadays. As we knew Technology also one of the factors to increase the productivity (Chayadi, 2014) along with the factors such capital, level of wages, production quantity, and investment.

In production management, there is a theory about push and pull strategies where push strategy was based on forecasting quantity produced, while pull strategy was based on where the production will produce according to the market demand. Both strategies have advantages and disadvantages. Wiracana production planning used the combination of them. They have two orders type, the first one is based on request while the second one is for stockiest to fulfill their gallery. The strategy helps them to fulfill the customers demand without worry in terms of quantity.

METHOD

Definition

According to Zikmund (2009), research is a process to describe characteristics of a population and phenomena. It could also be explained as a process of enquiry and investigation; it is systematic; methodical and ethical; research can help to solve practical problems and increase knowledge.

Stages of the Research Process

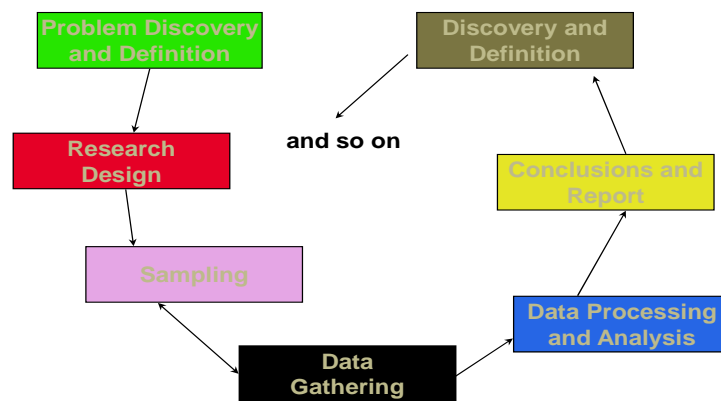


Figure 1 Stages of the Research Process

In this journal, the problem in Wiracana operation management is especially in production department. The method uses primary research by observation and survey. The research took in May 2014, by visiting and field investigating to Wiracana facility in Bali.

The Production Management

The production management is designing, operating, and improving the productive systems – system for getting the work done. Operations are often defined as a transformation process. Inputs (such materials, machines, labor, management and capital) are transformed into outputs (good and services). (Russell, 1995)

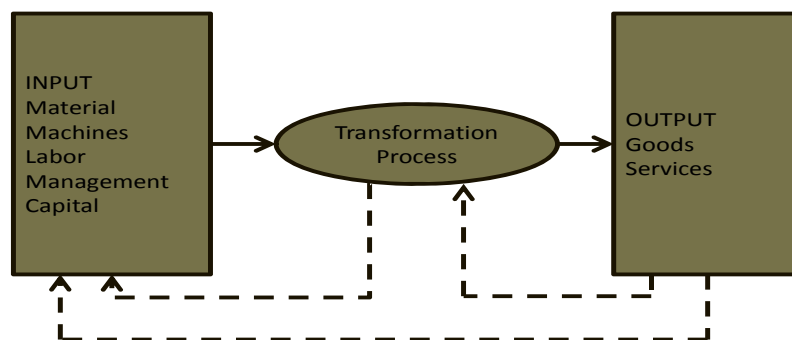


Figure 2 Production transformation process

Obviously, “Operation” can take many different forms. The transformation process can be: (1) Physical, such as manufacturing operations. (2) Locational, such as transportation or warehouse operations. (3) Exchange, such as retail operations. (4) Physiological, such as health care. (5) Psychological, such as entertainment. (6) Informational, such as communication.

The Evolution of operation management: (1) Craft production. (2) Division of labor. (3) Interchangeable parts. (4) Scientific management. (5) Mass production. (6) Lean production.

CV Wiracana tried to move from home craft production to small scale industry with some machinery, but for some products, they still continue giving special treatments by the craftsman style to keep the uniqueness of their products, such as crafting in sandalwood, bone or ivory, embellishing the fans with feathers or other ornaments such as diamonds or gems. If they only concentrated in craftsman's products, they could not take orders in big quantity. After they reform the management and the marketing way, the quantity which they received were increased significantly. If they only use the mass production, they would not be able to fulfill custom demands. So, they decided to combine the strategy by using machineries for mass productions, but also use human resources for special request orders or limited orders. As the total production could be conjunction with the increment of workman productivity (Chayadi, 2014)

Therefore, according to Russell (1995), types of processes will determine the continuity of the business. The process strategy is found on the diagonal of the matrix. Companies or products that are off the diagonal have either made poor process choices or have found a means to execute competitive advantage.

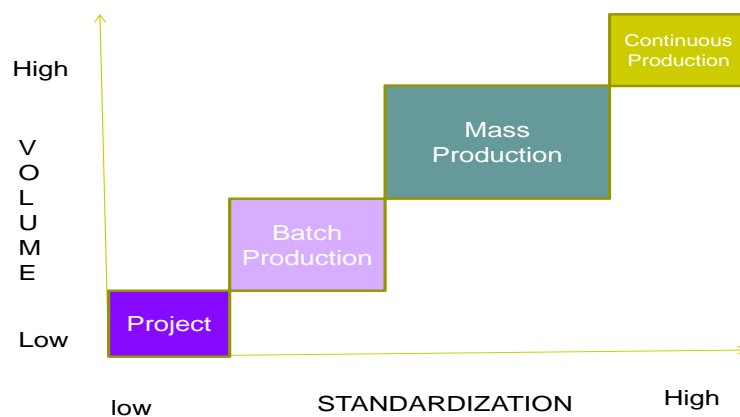


Figure 3 The Product-Process Matrix

The same case happened in MCM, a Germany bag brand, which only use craftsmanship’s for their product in the early time. They could only receive small quantity demands, because of the limited resources. They have repositioned their brand to other level as can be seen from the diagram below:

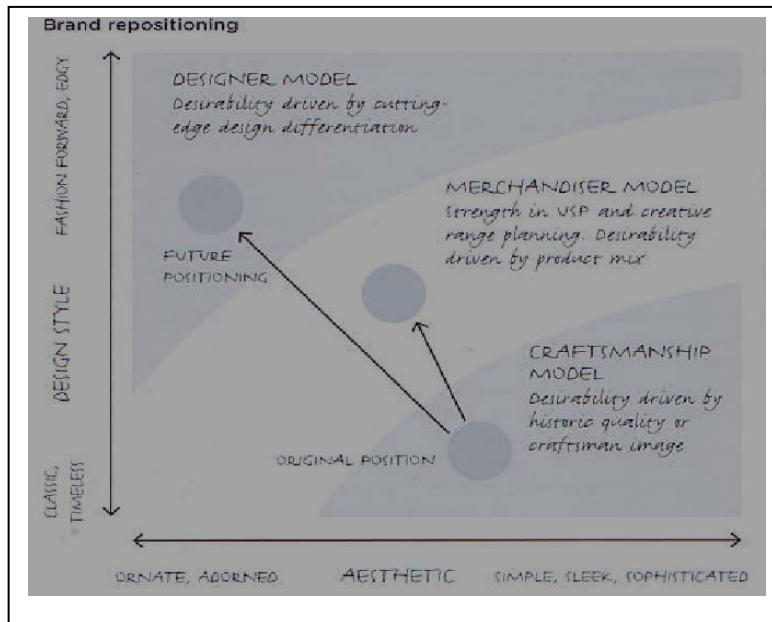


Figure 4 Brand re-positioning at MCM (Posner, 2011)

It is expected that CV Wiracana could improve the production without losing their product uniqueness. From the table below, it also strengthen their competitiveness by choosing hybrid strategy. If they have custom project orders, then they will use the craftsmanship strategy. They will use artists, which make folding fans by giving them very special treatment to produce high quality and unique fans, such as folding fan arts. Of course, it will have a limited number of quantities produced, and they will choose niche market for this kind of production, for stockiest strategy they will use mass production.

Table 1 Type of Processes

	Project	Batch Production	Mass Production	Continuous Production
Type of product	Unique	Made-to-order	Made to stock (standardized)	Commodity
Type of customer	One-at-a-time	Few individual customers	Mass market	Mass market
Product demand	Infrequent	Fluctuates	Stable	Very stable
Demand volume	Very low	Low to medium	High	Very high
No. of different products	Infinite variety	Many, varied	Few	Very few
Production system	Long term project	Discrete, jobs shop	Repetitive, assembly lines	Continuous, process industries
Equipment	Varied	General purpose	Special purpose	Highly automated
Primary type of work	Specialized contract	Fabrication	Assembly	Mixing, treating, refining
Worker skills	Expert, crafts persons	Wide range of skill	Limited range of skills	Equipment monitor
Advantages	Customs work, latest technology	Flexibility, quality	Efficiency, speed, low cost	High efficient, large capacity ease of control
Disadvantages	Non-repetitive, small customer base, expensive	Costly, slow, difficult to manage	Capital investment, lack of responsiveness	Difficult to change, far-reaching errors, limited variety
Examples	Construction, shipbuilding, spacecraft	Machine shops, print shops, bakeries, education	Automobiles, televisions, computers, fast food	Paint, chemical, foodstuffs

Delivering the goods

Taken from Kaizen philosophy: machines, facilities, and people should work together to add values. Kaizen are likely to be effective if workers were working as a team rather than individuals. The process of upcoming up with goods, ideas and solutions is often the product of the synergy created by people that have different skill sets, qualifications, or ways of seeing the world. By adopting this idea and implemented it to the simple lean, Wiracana are expecting that they could minimize the waste and boost up the production efficiency.

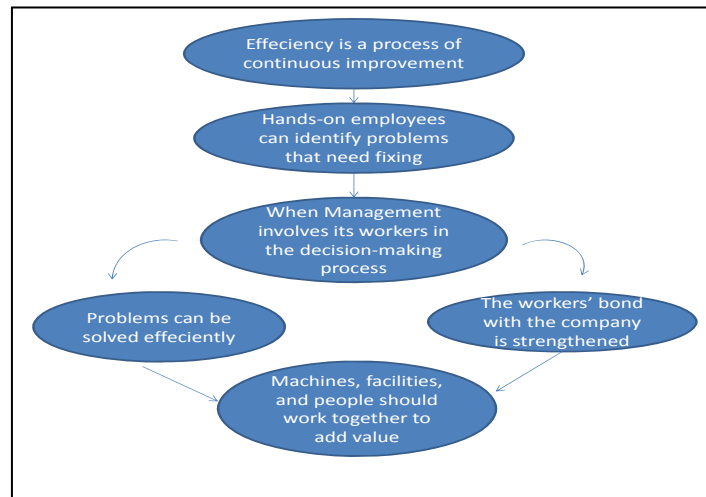


Figure 5 The relations in between machine, facilities and people (DK Publishing, 2014)

RESULTS AND DISCUSSION

The Production

Currently CV Wiracana has some machines on the production. The layout out using the short range production scheduling, cited from Edward, David, Rain (1998) can be summarized as: (1) Tracking work-in-process (WIP) inventory. This task involves finding the location of each part in the factory. In many shops, this is a trivial task, but in large factories, it can be very time-consuming. (2) Monitoring the status of machines and people. For example, has a particular CNC milling machine been repaired yet? Or, is the setup of a certain machine finished? (3) Tracking throughput. Throughput was defined as the number of jobs (or individual items) completed per unit time. A manager might be interested in a report of last month's throughput compared with an established standard for the shop. (4) Production/material control and feedback, is related with short-range scheduling, and provides feedback on deviations from due dates, quality standard and so on.

CV Wiracana adopted model one machine in a job shop as per below diagram,

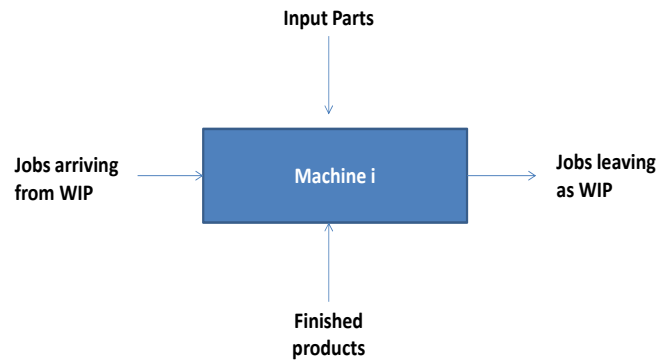


Figure 6 A job shop diagram

Two types of loadings that were commonly used are horizontal and vertical loading. By assuming from CV wiracana loading setup, we could say that it has been using horizontal loading. The owner actually does not understand of what the production model that he used. He only knew to make the production as efficient and effective as possible. The idea to make integration between human and machine without losing the art sense is one of the challenges that he face. To fulfill the demand and also to create a master piece should be harmonized together. Based on writer investigation field, we tried to analyze the model of their production line.

On the production line they have cutting machines, oven machines, pond machines both manual or laser cutting machines, also printing laser machine for fabric. The fans made from fabric, woods, seashells, ivory and other materials. The materials will determine the cost of gold sold. The defect on the expensive material such ivory or sandalwood should be zero, and this is very difficult to maintenance in the large quantity number. Usually for the expensive materials they will put on the manual line, the fabric painting will use hand painting.

The components of the Fan

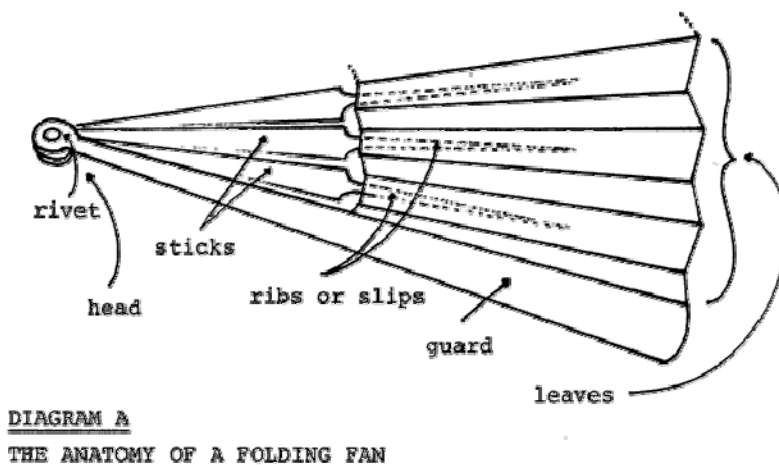


Figure 7 The Anatomy of a Folding Fan (Maxson, 2011)

Production Flow

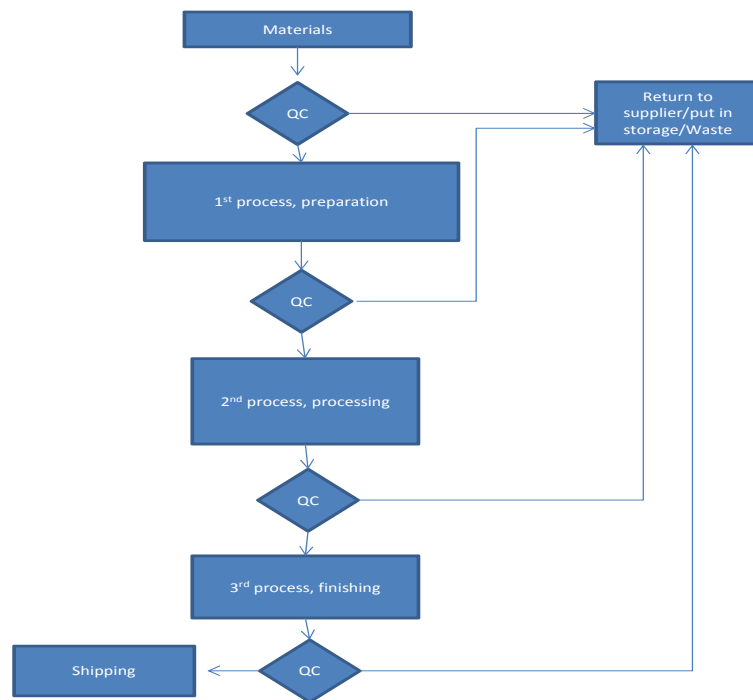


Figure 8 Production Flow

1st Process, Preparation

Materials come into the warehouse, check by Quality Control, should any defect it will return to the supplier or put in storage or waste it. The materials calculated based on the request order and stock sales. The real request order will treat as per manual process as the quantity usually limited or special, then for stock it calculate based on projection.

Materials will put in warehouse first, the fabric will screen by the fabric detection defect machine before classify them and put in storage. Woods will go to cutting machine and oven it in hours; normally it could more than two days until they get some certain degree for the Moisture Content (MC) of the wood (Washington State University, 2000). They must careful on this stage, as if the MC is not suitable with their pond machine once the wood stick in pond process it could be broken.

As mostly the wood took the biggest consumption in fan construction. We more stress the process on the wood first. After the wood finished oven process then it will come to second cutting machine. It will form into wood stick in particular thin measurement almost looks like tick paper sheet. It will stack into 20 sheets of wood stick. The stack will go to pond machine and forming into certain carving form. It saves time by pond the woods rather than hand crafting it one by one. The machine helping much on the productivity. Pond process also could use the laser cut machine, it will help to make special craving design or customized based on customer's own design. At this time laser cut machine still not maximize but really help if they received complicated design where the pond manual machine could not afford it.

Some materials will such fabric will cut as per fan width. And classify it based on the line number. Other such feathers, seashell, or string will go to their for further process.

2nd process, Processing

After the wood sticks coming from pond line, it should be smoothing first, then they will go to coloring line using paint or lacquer depend on the design. After coloring, the woods stick should be dry first it could take hours but usually the lead time should be the same or at least will be averagely the same as all the wood have the same dryness level (MC) on absorbing the dyed process.

After all wood sticks dried, it will be collecting and stacking to be per set fan. Then it will go to QC and select for the best quality and forming into fan frame or it technically called as Ribbing. The fans ribbing to go to assembly line, wiring to be fan ribbing.

3rd process, Finishing

After ribbing finished in the processing phase done, the ribbing will go to QC check. The construction should be straight and proper, could not make the holder hand getting hurt and more important thing whether the ribbing could be folding and flip out easily in one shake. Passed from QC, the ribbing will be attaching with fabric or some embellishment such lace, stone, gems or even diamond or it technically called as leaf and rivet. For some fabric will print as per customer request. The laser printer will help to make similar picture based on design.

Once again it will go to the final QC, the folding should be straight and strong for long time, as they do not want received any complaint after sales. One of the folding hand fan core value is strong and technically proper not only for the limited edition or special request but also for the mass production. The last step is attaching the tassel on the fan head. And put in the fan cover made from fabric such Shantung silk or real silk to make fan looks fancier. Finally it ready to ship around the world or display in their shop.

The following pictures in clockwise rotation could give some image for their production process. Starting from their pond machines until the finishing area, for others machines could not be displayed due company policy.



Figure 9 The pictures of production processes

The processing schedule

As per our discussion on top, assumed Wiracana using Horizontal loading processing schedule, it allow the work centers make scheduling for jobs and the process will repeat until the all jobs done. The owner said that currently Wiracana could produce about 800-1000 pcs per day. It is about 30-35 pieces per hour. One fan took 1-1.5 minutes to make. It really amazing compares with manual process where to produce one fan could be took hours and even days. But according to the owner ideally they should produce 2000 pcs per day or at least 50000 pcs per month. With currently they had 2 group of worker; the first one is in-house workers and the other external workers. Internal workers about 150 persons and another 100-150 persons place to surrounding prison where the prisoner could take the job as per their social activity. This activity is not only being Wiracana core values as their corporate social responsibility but also adding the capacity production.

Table 2 Example of Processing Time Loading

Job	Priority	Machine		
		A	B	C
1	Second	2	5	4
2	First	6	3	7
3	Third		4	7

The illustration from Silver, Pyke, Peterson (1998) is used, then if the data to figure the Wiracana production scheduling is used, three jobs are to be scheduled on three machines. The second priority job, job1, is then scheduled, followed by job 3. See figure 9 and note that Job 3 or J3 (for following J will replace Job) can be assigned to machine B at time zero because this machine is idle, and inserting J3 will not cause a delay in J1 or 2. J3 cannot be assigned to machine C, however until the higher priority jobs are finished, because it cannot be processed earlier without delaying J1 and 2. J3 requires 7 hours on machine C, but only five hours are available (after it completed on machine B). If it happens that J2 is delayed on machine A or B, it may be possible to insert J3 on machine C the next time the system run. The time ranging in this schedule is 27. Therefore beside need long hour also can suffer from excess idle time because the focus is on jobs rather than machines. In other words job are put into schedule in sequence without regard for gaps in the machine schedule.

This kind of situation happened to Wiracana's current production; with their short term planning to increase the productivity at least 2000 pieces a month on 2015 afraid they could not achieve the goal unless they change the production schedule planning. See Figure 11 where the vertical loading set up based on Jobs availability. From the jobs availability the priority which need to load first is chosen to minimize the lead time and usually it is called as Shortest Processing Time (SPT). Therefore, J1 will loaded first follow by J2. Then take a look to Machine B, the only possible time in machine B is J3, so it would schedule first. When it finishes at time 4, only job 1 can be scheduled. Likewise on machine C the fix schedule is J3 at time 4, once complete J1 is the remaining that can be scheduled. The time ranging is 22. Shorter than horizontal loading means the production cost also lower.

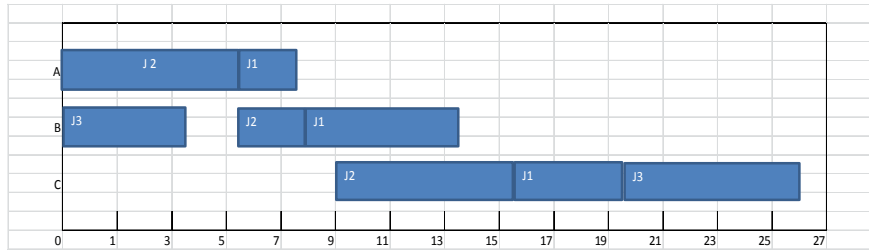


Figure 10 Example of Horizontal Loading

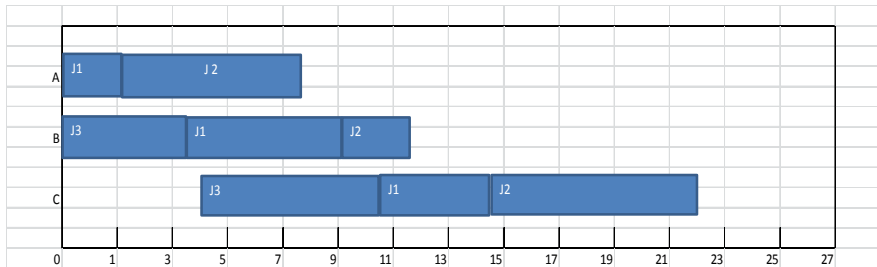


Figure 11 Example of Vertical Loading

For example, they have 20 pond machines currently and 2 laser cut machine. If we assumed the productivity is 100% one machine could produce 1000 sticks a day, it could be produce more or less about 800-1000 pieces as 1 fan consists of 22 sticks. Using above illustration from time ranging 22-27 there is about 20% reducing time production if in example in a day with 8 hours production expected only 800 pieces due the time reducing around 20%, the jobs could be done 6.4 hours means for another 1.6 hours that could produce for at least 160 pieces or in total to be 960 pieces.

To increase the productivity as per target from 1000 pcs a day to 2000 pcs is about 100% increment. By logical thinking to double up the machinery is a must, if we roughly calculate for current in example they have 20 units machine means to double up they need 40 machines. But plus changing production scheduling from horizontal to vertical expected they could shorten the time at least 20% decreased. Because of this saving probably they only need to add 16 machines instead of 20. Of course not only machine and scheduling, the manpower also holds the most important part, more skillful the manpower more efficient the working load and also could minimize the defect and error. As mentioned

CONCLUSION

Based on writer observation and investigation field to Wiracana (2014), actually at current time, they succeed to implement the home industry system based on machinery system. Although the system still combining or still trial and error, but for small scale industry is almost enough to say simple lean production, they able to fulfill their customer demand without losing their art of sense. A Homemade industry but excellent in production speed is the most important value for Wiracana to grow. The harmonization in between technology and manpower should work together really obvious in their system which probably could be a model for others SMEs company.

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