Scheduling - An Index Factor in Production Planning Control

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Abstract- Scheduling exhibits a wide range of usefulness and hence, it has been found relevant in almost all production sectors. Inability of middle product to last longer due to the effect of various production decision ranging to storage is neglected, also limited shelf life as the various steps of its production cannot be discontinued. The objective of this paper review is to ascertain an index factor in production planning control on the measure to be taken that will serve as a major boost in a production system, making it possible for an organization to meet up to the target of delivery, enhance resource utilization and enable organizations to know the time of arrival of resources to be used together with the cost of transporting the finished products, schedulling approaches and key performance indicators. Better resource utilization and efficient scheduling processe improve capacity utilization, production throughput and effectiveness of fixed asset. Improvement in equipment performance are achieved by making judicious use workforce and time in a production system so that the output is made available within the given time so as to be made on-time for delivery. Making adequate arrangement towards production and coordinating workload during the period of production are primarily targeted towards minimizing the cost, ensuring profitability and maximizing awareness of the production system

Index Term - Control, Scheduling, Production, Planning, Index factor

I. INTRODUCTION

Schedulling is defined as the process of coordinating and organizing workload in production process [1]. The purpose is to enable production of a given product to be organized before the end date by ensuring that every component is put in another to avoid delay which may be as a result of the rate at which competition increase [2].

An organization must improve in the way they perform their duties by making a decision on a particular sequence to follow in production because is highly significant in efficient production as well as linking demand and supply by making organizational resources available to customers as at when due [3]. The purpose of sequencing activities is to be able to ensure that resources are made available for execution through the process of planning by providing a sequence with the resources allocated at that period so as to reduce difficulty experiences or challenges in the following conditions; the making length, beginning /end time, cost incurred during production and profit maximization [3]. All the approaches and methods of sequencing in a production system is used for maintenance of the organization where it is being carried out [4].

Production involves a process range of actions and the way they are performed in respect to time and cost as it is better understood as "the step-by-step conversion of one form of material into another form so as to bring into existence the benefit of the product to the consumer by sequencing the jobs, assigning the work to be done by the machine and the time taking for the job to be completed [5]. In order to thrive well, production system need natural resources to implement his plan for production through sequence of work operation using appropriate equipments and machines so as to ensure that the profit of the organization is enhanced [6]. In other to be able to undergo proper production, it is important that the capacity that will enhance its production must be first put into consideration before the resources because it is a series of processes in batch and purposes where certain product are assigned for different equipments. Discovery from studies, survey shows that in order for productivity to be improved, proper consideration must be given to coordinating and organizing a workload in a production system to avoid poor growth of the organization, hindered operations and small income [7].

1.1 Challenges

The major problem is as a result of issues arising from sequencing work that can be derived mathematically making this difficult, but if work is properly segmented, then it is possible to get solution to the problems of sequencing work during production [8]. In addition, inability of middle product to last longer plays a major impact during production because the effect of various production decision ranging from scheduling to storage was not put to consideration making it more difficult to schedule in a production process; also limited

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shelf life is core in regards to meeting up to high demands as the various steps of its production cannot be discontinued thereby making it to be a single process [5]. Another problem of sequencing work in a production process arises from considering time in a particular process as more important than the other together with the unavailability of resources [9]. Disruption during production result in an increase in overtime before and after production in each process. It is difficult for those performing sequential work operations in making it realizable because the production process has advanced to a complex stage. In the process of making sure that the product is delivered on time, the time left for the product to deliver will either be small or large, because the period of time before a product is delivered to the customer tend to be considered more crucial as the most important lifeline as it has its cons on the subsequent path of the process in most jobs [10].

1.2 Benefits

Reduction in process length, profit maximization, Reduction in the cost of investment in production by locating the best fit for its capacity [11]. It gives a timetable for production activities, vital determinant for Key Performance Index's professional requirements[12]. It makes easier to accomplish the targets for the clients by providing adequate plans beyond the organization's jurisdiction to ensure on time delivery to customer [10]. Ability to see what the customer really needs and how to get the product to them, expenses incurred during production from one level to the other so as to help those working toward proper optimization of its product[13]. Adequate organization during the sequence of work operation and union with those who are expert in schedulling increases effectiveness[12]. Better resource utilization and efficient schedulling processes, improve capacity utilization, production throughput and effectiveness of fixed asset, improvement in equipment performance through a better system of coordinating and organizing a workload for maximum result [14].

The objectives are

- To attain greater efficiency in production [15].
- To coordinate the facilities of production [16]
- To make adequate use of the resources available for its production and minimize cost [17]
- To monitor other sector of its production so as to avoid disruption during production flow [12].
- To avoid delay by undergoing adequate study in determining the output and the time differences [13].
- To make judicious use of time in a production system by making use of a work force so that the output is ready within the given time so as to be made on-time for delivery [18].

II SCHEDULING APPROACHES

Wide range of approaches to solving the problem of organizing and coordinating activities in a work load have been published over the years, Graves stated that most theory are not adequately developed to be applicable to scheduling problems ,thereby leaving a missing link between theory and practice [19]. In most instances, heuristic approaches can discover a possible solution to the problem of schedulling, provided it can be mathematically formulated.. Another approach to schedulling is a discretion which emanates from applied knowledge as they see what is to be done as a process of knowing the conditions and the steps to be taken [20]. The process of evaluating various decisions has given much attention in the development of methods that is limiting the satisfaction and programming tool [20]. The process of linking discretion, with process has not been in existence for a long time, thereby leaving a gap left to be filled. [18]. Making use of an organized and coordinating system of workload using discretion is not mostly inputted to use after the process of production because of its concentration in evaluating and providing a back up to the previous task been performed on it but limited when trying to improve upon[28]. Furthermore, there is also a major serious debate due to operation been performed regarding the task that should be done using computers and those that should be handled by the human system [19].

Many literatures have also touched different aspects of industries involve in production, but only a few which include changes in yield and risk of processing time have been combined at the same period, thereby resulting in problems of organizing and coordinating a workload to be neglected[30]. From analysis, evidence shows that the majority of the researchers focus on using discretion partially on solving situations resulting in approaches that cannot be utilized because of human aspect being neglected in organizing and coordinating workload [21].

2.1 Problems reduction approach

This is a technique dealing with a multiple problem where result oriented writers stated that the methods of reduction attempt to propose a way out of multiple problems by reducing the multiple problems being encountered into subunit so as to be easy to locate and understand the root cause thereby proposing arguments[22]. In the arguments of reduction; the first stated that not all circumstances been encounter are equally crucial by looking into the subunit of the problems in order of priority while other arguments suggested

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that more than one operation to be coordinated and organized can possibly have multiple properties making the structure to have an edge over others in terms of computation [23]. In addition to organizing and coordinating work load can be understood both as structure and decision processes [24]

2.2 The task-oriented approach

This approach organizes and coordinates workload that is not just limited to the decision making task alone, but being joined by several tasks or work that are under controlled by the organization which has a significant impact in organizing and use of knowledge involving technology by the specified number of people [25]

2.3 The Feedback Control approach

This approaches arises from situations that are not expected, which involve malfunctioning of the machine being used in production with the arrival of new task responsible for inefficient flow during a production process reason arising from the time being used by various programming languages in planning for production [6]. Furthermore, this method of schedulling mostly find relevant in an environment that one can suggest the outcome, thereby making the similarity between the actual product being produced and the plan it follows to produce to be increasing [17].

2.4 Routing Techniques for Effective Production Planning

Routing is defined as the process of undergoing the work operation till the materials actualize the desired shape; some of which comprises of the nature of the work to be done, the sequence of operation necessary, the place the work will be done and a thorough grouping on the human system that will be used in the work [18].. The routing plays a vital role to ensure the capacity of the plant deliver the best result thereby providing a foundation for schedulling [19].

i. Route card: this card is always put together with the job carried out in all its operations showing the various materials that is being used during the production process together with a statement showing the report of each operation as it moves from one point to another. In addition the output of the production is put to record [20].

ii. Route sheet: it is made from sheets which comprises of other recognition of the sequence, signs and ability to recognize the component, number of pieces in each batch and the information regarding its operation and functioning [22].

iii. Worksheet: it is primarily designed for production and maintenance; comprising of direction to be undertaken during the process of production together with information that has to do with the path each product follow with the recognition number on the machines being used at every process and the location at which the work is being performed [23].

iv. Move order: this contains files that are made ready for every segment of operation in every sheet required for control during production, thereby making each item that is either scrapped or adjusted to be put to record [24].

III KEY PERFORMANCE INDICATOR MEASUREMENTS

This measurement is aimed towards discovering the vital sign of product performance during a production process and it includes the followings;

3.1 Product Delivery at due time

When a plan to be followed in the production process has been determined, product delivery at the due date is defined as the quantity of product deliberated upon that will be advantageous to the targeted date for production before the date of delivery divided the plan been made for the present week [24].

3.2 Accomplishment Rate for the plans of the week

The accomplishment rate for the plans of the week is a measurement that clearly indicates the total number of plans made for the new weeks having been chosen from the recen plan been determined for production[45]. .A great accomplishment rate of the plans for the week simply can be summarized as the sum total of the work load that is to be coordinated and organized in the plan for the present week and then proceed with the plans for production that takes the high part of the recent plan been determined [25].

3.3 Tardiness of Residual Plan

This plan is another step that indicates the total number of plans chosen from the present week of planning before the due date given by the customer after a new date has been determined; This simply summarized the date to work upon if the organization producing failed to meet up to the determined date [26] .

3.4 Utilization of capacity

Utilization of capacity is defined as the operation period of the equipment towards making a specific number of produce in a single day [27].. This further means the total number of time equipment spent a day in producing a certain number of

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products which can be compared to other days in determining the depreciation rate of the equipment as well. For example, if takes a water bottle producing machine to make 500waterboottles in day one and produces 499 water bottles in day two, it simply explained the capacity that was utilized and the capacity depreciation between day one and two and possible outcome in the following day [28].

3.5 Change in Rate of work

Change in the rate of work is a measured of the essential work that is being changed per equipment. This is a significant issue in relating to effectiveness because the period of time in transition is dependent on the particular work being undergone previously in production [19]..

3.6 Number of Lengthy leisure time

This is defined as the number of times beyond an hour in a day where everyone in the organization is free; time of the day when nothing is done on planning for work, coordination work load and production which might be as a result of unexpected circumstances occurring in the organization. It includes the time spent in waiting as a result of the work changes and the time the equipment is not utilized [29].

3.7 Cost of operation

This is made up of two parts comprising of the processing and setup cost where the processing cost contains the amount spent during the production of the product and the setup cost is defined when a work A is removed from production after a series of process to allow work B to start, the cost spent in the process of removing the initial work will be assigned to the initial work [30]. Waiting Cost for work;. This is defined as the sum total of the cost of the raw material necessary for the work and the cost that will still be incurred during the period of production before the period of waiting as a result of unavailability of machine (31).

3.8 Machine leisure Cost

This occurs when a machine is not in operation resulting in cost forgone. The machine leisure cost increases with the time the machine is not used to show what the machine could have made in production if been utilized at that particular period of time [32]. Total Opportunity Cost: is defined as the process of representing the cost of product being lost from the production line due to the sub standardized product or the failure of the product to attain the quality been targeted by the organization [33]. For example, if a Coca-Cola company want the quality of its coke to be ninety five percent and along the line of production indication shows that the raw materials are of low standard, then the quality will be altered leading to the lost of the product because it will not meet specification that is being targeted; therefore total cost incurred in this process is called the total opportunity cost [34].

IV CONCLUSION

Measures taken in making adequate arrangement towards production and coordinating workload during the period of production are primarily targeted towards minimizing the cost, ensuring profitability and maximizing awareness of the production system. The major factors responsible for propelling coordinating and organizing a workload in a production system are the immovable part of the production building, line of process and the market where the market factors explain the number of people waiting to buy the goods being produced, line of process specifies the path through which raw material pass through before the product and the immovable part of the building housing the equipments and the work force in the production. The propelling factors are all crucial because they all depend on each other without the immovable building that will house the equipment, there can never be a thought of production, also without a line of the process that the product will undertake, there can never be a market for it because nobody is ready to use his money to buy unfinished product [35]. Measure taking in scheduling serves as a major boost in a production system, thereby making it possible for an organization to meet up with the target of delivery so as to enhance resource utilization and enable awareness of resource arrival together with the cost of transporting the finished products

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