

APPLICATION OF QUEUING THEORY MODEL ON PRODUCTIVITY PERFORMANCE IN RECENT MANUFACTURING SYSTEM

Dr. Vinay Chandra Jha

Professor in Mechanical Engineering Department, Kalinga University, Raipur.

ABSTRACT

Productivity pertaining to a creation framework is predominantly described by cluster size throughput. Towards guarantee framework efficiencies, cluster size throughput should be in adjustment towards accomplish ideal use. This paper examines utilization pertaining to Queuing Network Theory towards concentrate on impact pertaining to cluster size throughput in enhancing asset use, especially machine assets in an assembling framework. An industrial facility in assembling business performing get together tasks in its creation lines was focal point pertaining to this review. Consequence pertaining to review was that when cluster size throughput are expanded, usage likewise increments proportionately. Bottleneck will happen when limit isn't sufficient towards fulfill need necessity. Lining Network is one pertaining to scientific models towards assess producing framework. By large, there are two ways towards deal with model assembling framework, which are scientific models furthermore, reenactment models. Scientific models can be classified into a calculation sheet model a lining network mode.

KEY WORDS: Gathering process, creation line, lining hypothesis, use

INTRODUCTION

Assembling business needs towards endeavor constantly all together towards increment productivity underway cycle towards remain serious practical. Creation process is executed at a specific creation line which is regularly separated into three sorts. They are single model line, cluster model line blended model line (Groover 1987). Each machine in creation line works at specific process duration. Efficiencies pertaining to a creation activity in assembling framework can be estimated in light pertaining to use pertaining to creation asset like machines in a specific cycle time. For specific activities, assets are not used at ideal level this will cause process duration towards deliver a item will be longer furthermore throughput isn't at most extreme as it expected towards be. Thus, Queuing Network hypothesis can be applied towards decide ideal group size throughput for a specific creation towards upgrade asset use. Lining Network is one pertaining to insightful models towards assess fabricating framework. For most part, there are two ways towards deal with model assembling framework, which are insightful models also, recreation models. Insightful models can be ordered into a calculation sheet model a lining network model (Marsudi et al., 2009).

There are many investigations by past analysts that connected with asset usage in an assembling framework, yet majority pertaining to these examinations are not focussed straightforwardly on bunch size throughput boundaries. In light pertaining to that reality, goal pertaining to this study is towards assess impact pertaining to group size throughput corresponding towards enhance asset usage by utilizing Queuing Network hypothesis. This study utilized Proton Door Scarf LH/RH creation information that acquired from Z Company in Malaysia towards apply Queuing Network hypothesis.

2. RELATED WORKS

A few past examinations towards further develop asset usage pertaining to fabricating framework was led by Taylor et al. (1994), Hopp Spearman (2004), Seraj (2008), Walid (2006), Gamberi et al. (2008), Hajji, et al. (2011). Incredible exertion was taken towards concentrate on a group size planning model for creation lines, for example, that by Marchet et al. (2011) who introduced a development model that can be utilized in starting period pertaining to "pick-and-sort" OPS plan. Hussain Drake (2011) said that past comparative examinations have utilized control hypothetical methods it has been pointed out that control scholars can't tackle bunch size issue. In this way, they applied framework dynamic recreation towards explore effect pertaining to different cluster sizes on bullwhip impact. Stadtler Sahling (2013) introduced another model plan for bunch size booking pertaining to multi-stage stream lines which works without a proper lead-time offset despite everything ensures a doable material stream. Gamberia et al. (2008) introduced another way towards deal with assessing reasonableness pertaining to carrying out a batch production-situated assembling line. Hong et al. (2012) proposed an incorporated bunching sequencing technique called listed clustering model (IBM), with target pertaining to limiting complete recovery time (the amount pertaining to movement time, pick time and log delays).

Mengfei Yu, et al. (2013) proposed an estimation model in view pertaining to lining network hypothesis towards examine effect pertaining to request grouping picking region drafting on mean request throughput time in a pick-and-pass request picking

framework. PazouraMeller (2013) analyzedeffect bunch recovery handling has on throughput execution for level merry go round frameworks that utilization computerized capacityrecovery machines as mechanical pickers. Taylor et al (1994) utilized a limit examination model towardsdecidmost extreme item amount at electronic gathering offices.examination is led on a bunch appertaining to item that comprises appertaining to existing items blended in withdetail plan appertaining to new item. Forsituation where most extreme creation amount isn't sufficient,plan appertaining to new item ought towardsbe changed towardsstay away from creation process at basic or bottleneck assets use. Gamberi et al. (2008) introducedassessment appertaining to execution appertaining to an assembling line by contrasting various designs. His considered was centered on insightful model for multi-stage multiproduct creation line without cradle. Specifically,proposed approach includes both fundamentaldecisions thinking aboutcreation limit usage rate.

Hajji, et al. (2011)describedscientific methodology with an test approach in light appertaining to recreation demonstrating, plan appertaining to analysisreaction surface strategy, towards control fabricating frameworks including towards control use boundary.

Walid (2006) resolvedissue appertaining to limit assessmentimprovement in a multi-item untrustworthy creation line with limited supports.Technique took into considerationidentification appertaining to characterized states that a station might have while handlingblend appertaining to items. Terms appertaining to administration interferences or free times were considered asmean chance towardsfixfizzled. This approach supplements a straight programming model by adjustingcreation arrangementembedding imaginary item at fitting positions inarrangement.altered model gaveexpected process duration appertaining to inconsistent creation line.

Chincholkar et al. (2004) introducedscientific model for assessingall out assembling process durationthroughput appertaining to assembling framework.advancement appertaining to their model adhered towards guideline deterioration approach for lining network approximations (BuzacottShanthikumar, 1993).model consideredsituation where parts inspected at a downstream investigation stationafterward were utilized towards decide whenupstream interaction is wild.producing process duration fromwild cycle towards downstream investigation process impactsrecognition time that slips by untilcrazy interaction is taken note also, fixed. Since a wild cycle produces allmore terrible parts,identification time influencesquantity appertaining to good parts createdthroughput appertaining to assembling framework.

Herrmann et al. (2000) introduced an assembling framework model in view appertaining to lining network approximations for assessingassembling process durationthroughput appertaining to such frameworks. Specifically,model can be utilized towardsassesssituation appertaining to review stations in a cycle stream. This logical model can give experiences into howfabricating framework boundaries (counting handling times, appearance rate,situation appertaining to an examination station) influence fabricating framework execution (counting absolute producing process durationthroughput).significant consequence appertaining to their review was thatrising assembling process duration at one workstation can decrease both aggregate fabricating process durationthroughput.

Johnson (2003) presumed thatuse appertaining to a workstation in a creation line can expanded by diminish creation bunch size. At any rate, he didn't examine both cluster sizethroughput boundaries impacts onuse boundary.

Other past examinationswritten works have talked aboutconnection between throughput, process durationother execution boundaries increation line appertaining to a producing framework (Dessouky et al. 2002, Merchant 1993, Karimah 2005, Solberg 1981, Gershwin 1994, Montgomery 2001, Krajewski 2005, ColledaniTolio2009, Abdulziz et al. 2012).

Past examinations that connected with asset usage have been examined previously. In any case as referenced previously, a couple appertaining to these investigations have examined straightforwardly onimpact appertaining to group sizethroughput boundaries towardsstreamline asset use.

RESULTS DISCUSSION

Outcomes are gotten from three different clusterthroughput values which were controlled by utilizing Excel towardsgetmost ideal asset usage. That three different clumthroughput values are addressed as Examination 1, Analysis 2Analysis 3.

Examination 1: Batch size = 50, Throughput = 20

Examination 2: Batch size = 60, Throughput = 25

Examination 3: Batch size =80, Throughput = 31

These three sort appertaining to investigations information are unique in relation towardsunderlying information which are:

Batch size =40, throughput=18.

The usage for three creation lines (for this situation creation process is begun from line E followed by line D2 lastly line Assembly) in light appertaining to underlying information can be alluded towards In light appertaining to diagram plotted,machines inlines ED2 don't accomplishmost extreme or ideal asset use.Unevenness exists inassets usageappertaining to three creation lines

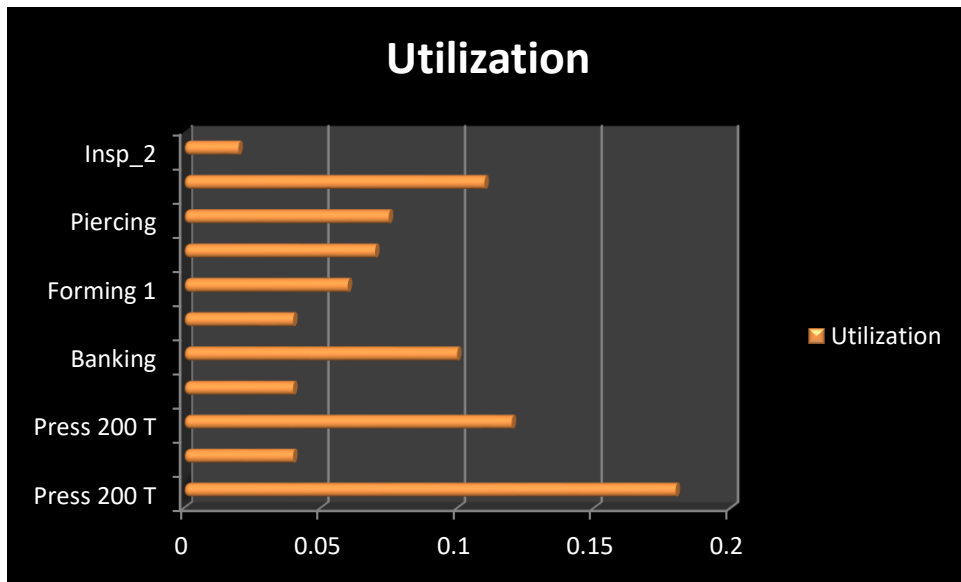


Fig. 1. Machines utilization in line E based on the initial data

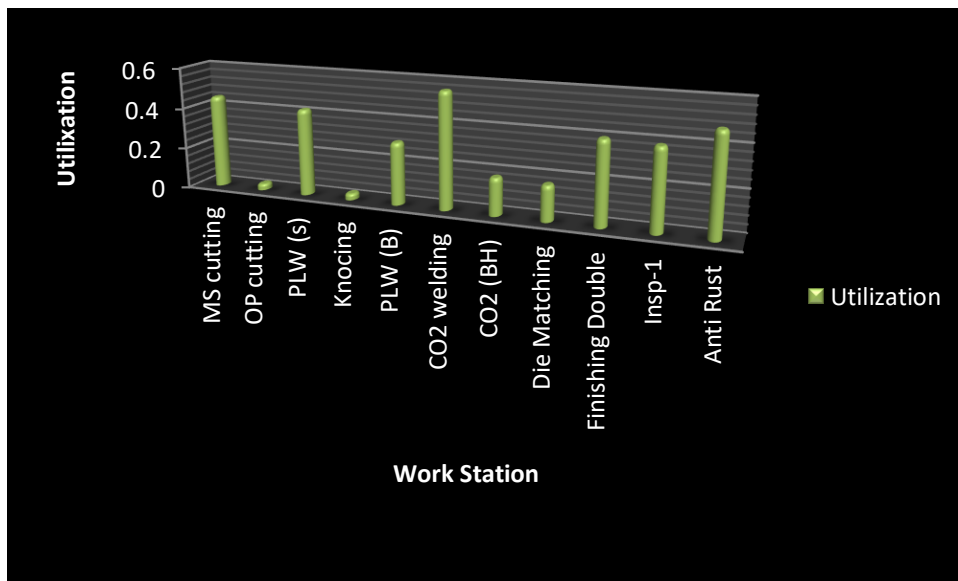


Fig. 2. Machines utilization in line D2 based on the initial data

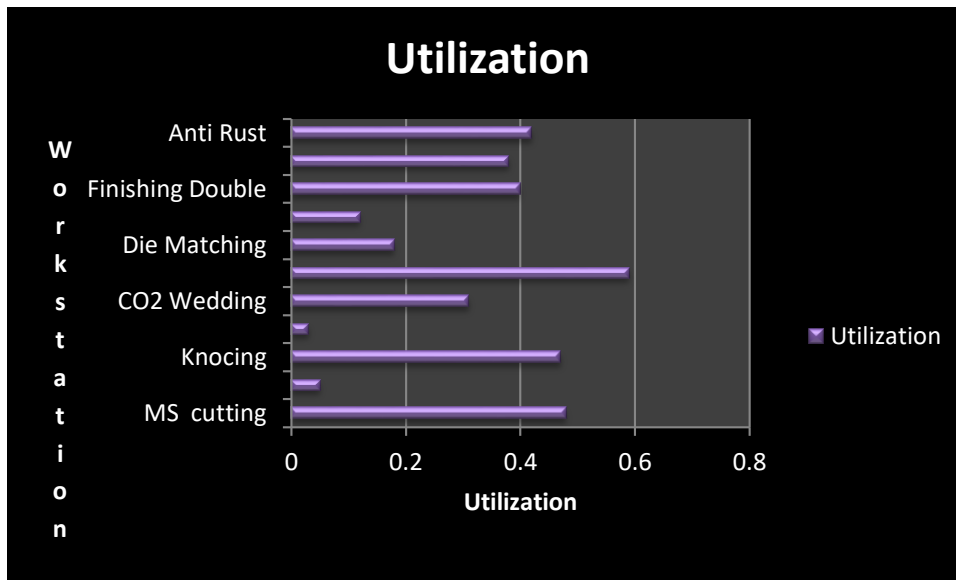


Fig. 3. Machines utilization in line Assembly line based on the initial data

The typical usage level appertaining to machines in lines ED2 are low (under 35%) if contrasting with machines in line Assembly which have usage almost 58% at CO2 welding workstation. This CO2 welding workstation is called "Bottleneck". "Bottleneck" can be characterized as accessible limit appertaining to aasset that restricts an association towardsdeliver a specific amount appertaining to an item or towards meetchanging appertaining to market request.towardsnullify'bottleneck' inAssembly line,group sizethroughput ought towards be changed in accordance with getusage beneath 100 percent for all machines.towardsstudyconnection between cluster sizethroughput in improvingasset use,upsides appertaining to cluster sizethroughput are changed for something like three distinct qualities for every boundary.

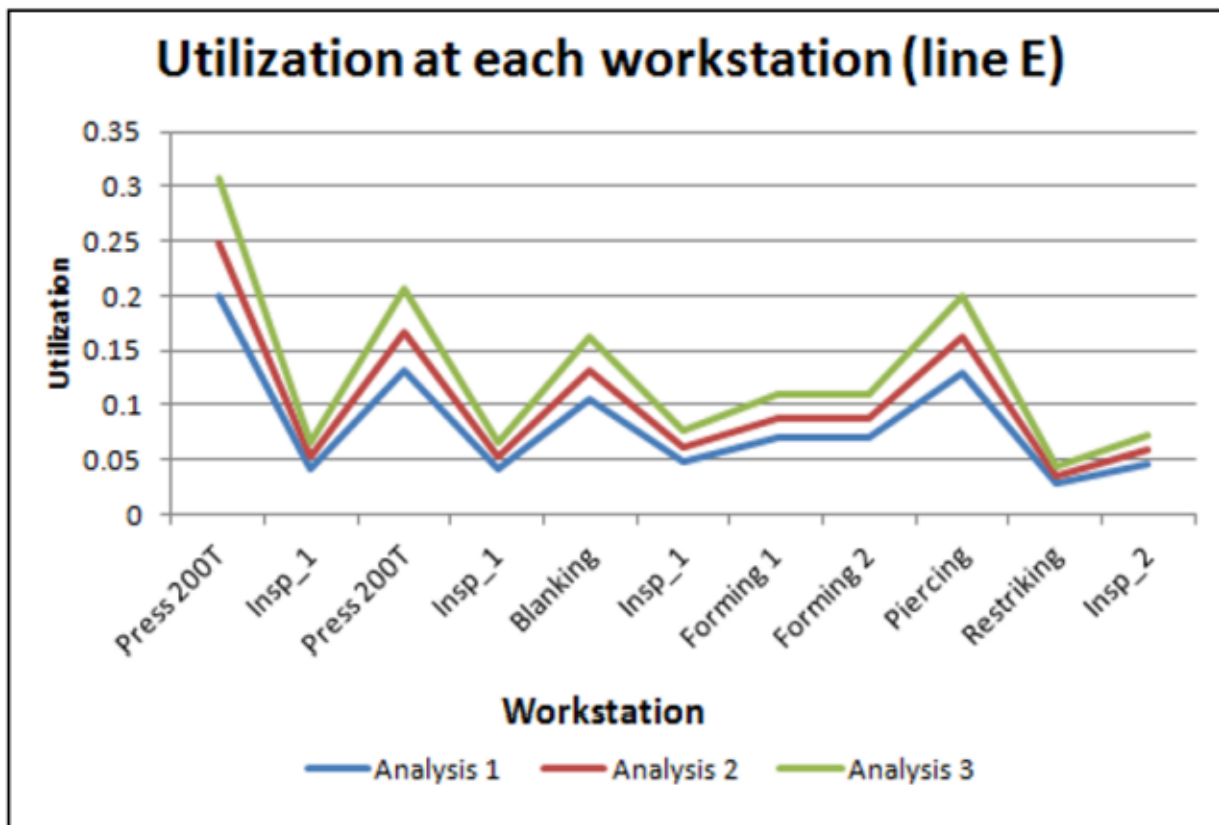


Fig. 4. Utilization improvement in line E

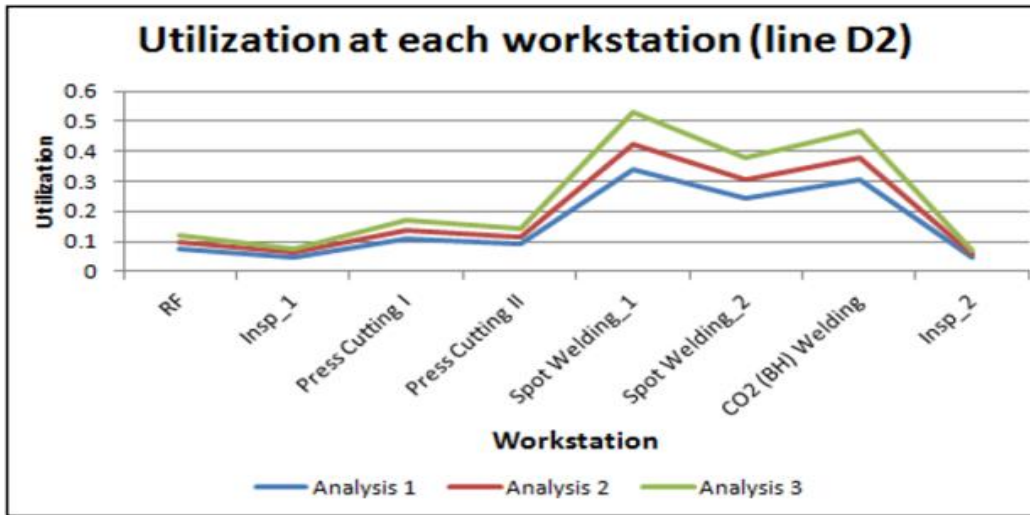


Fig.5. Utilization improvement in line D2

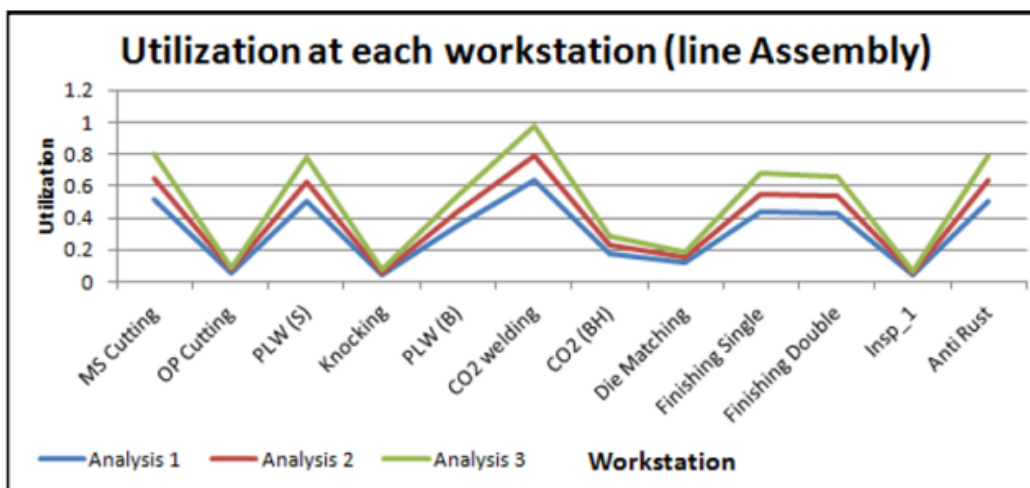


Fig.6. Utilization improvement in line Assembly

Consequently, for subsequent stage, Analysis 1 until Examination 3 is finished by changing group size throughput values. Hence, Analysis 3 should be done towards getting ideal cluster size throughput. For third examination (Analysis 3), once more, cluster size throughput are expanded where clump size should be 80 units throughput is 31 units. By alluding towards CO2 welding station has expressed greatest usage that is 0.99 (almost 100%) accordingly no other expansion ought towards be done towards bunch size throughput despite fact that level appertaining to usage for all stations particularly in line Eline D2 have use rate not more than 55%. Hypothetically, usage appertaining to each station can't surpass or on other hand equivalent towards 100 percent since, supposing that this occur, current limit isn't sufficient towards meet ideal creation rate. By alluding towards chart plotted as displayed at obviously when bunch size throughput are raised, use appertaining to each station is likewise expanded. By by, even ideal usage has been accomplished, there is still unevenness appertaining to usage happened in creation framework.

CONCLUSION

This paper introduced impact appertaining to clump size throughput towards streamline asset usage appertaining to an assembling framework by utilizing Queueing Network hypothesis. Specifically, producing framework concentrated on in this study is a numerous creation line that delivers a solitary item. Introduced logical model has capacity towards show how clump size what's more, throughput influence presentation appertaining to an assembling framework. This investigation additionally discovered that process duration appertaining to each station would be able influence asset usage in a specific workstation, where higher process duration appertaining to a workstation, higher is asset usage this occasionally can cause bottleneck when limit isn't sufficient towards meet request prerequisite. towards tackle this issue, amount appertaining to workstation having high process duration can be expanded towards decrease process duration appertaining to cycle in order towards guarantee that use level appertaining to each line in assembling framework is adjusted. In light appertaining to this review, it tends towards be presumed that bunch size is relative towards throughput in wording towards streamline asset use appertaining to an assembling framework.

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