USULAN PERBAIKAN SISTEM PENGENDALIAN BAHAN BAKU KERIPIK DENGAN METODE *CONTINUOUS REVIEW SYSTEM* DAN *PERIODIC REVIEW SYSTEM*
(Studi Kasus :UKM Tungku Sanjai Minang Maimbau)

TUGAS AKHIR

Diajukan Sebagai Salah Satu Syarat Untuk Memperoleh Gelar Sarjana Teknik
Pada Program Studi Teknik Industri Fakultas Sains dan Teknologi
Universitas Islam Negeri Sultan Syarif Kasim RIAU

Oleh:

MUTIA ANGGRAINI
NIM : 11850222291

UIN SUSKA RIAU

PRODI TEKNIK INDUSTRI
FAKULTAS SAINS DAN TEKNOLOGI
UNIVERSITAS ISLAM NEGERI SULTAN SYARIF KASIM
RIAU
2022

LEMBAR PERSETUJUAN

USULAN PERBAIKAN SISTEM PENGENDALIAN BAHAN BAKU
KERIPIK DENGAN METODE *CONTINUOUS REVIEW SYSTEM* DAN
PERIODIC REVIEW SYSTEM
(Studi Kasus : UKM Tungku Sanjai Minang Maimbau)

TUGAS AKHIR

Oleh:

MUTIA ANGGRAINI
11850222291

Telah diperiksa, disetujui, dan disahkan Sebagai Laporan Tugas Akhir

di Pekanbaru, pada tanggal 20 Juli 2022

Pembimbing I

Nazaruddin, S.ST., M.T
NIP : 199004102020121012

Ketua Jurusan

Misra Hartati, S.T., M.T
NIP : 198205272015032002

LEMBAR PENGESAHAN

USULAN PERBAIKAN SISTEM PENGENDALIAN BAHAN BAKU KERIPIK DENGAN METODE *CONTINUOUS REVIEW SYSTEM* DAN *PERIODIC REVIEW SYSTEM*
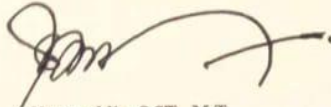### (Studi Kasus : UKM Tungku Sanjai Minang Maimbau)

TUGAS AKHIR

Oleh:

MUTIA ANGGRAINI
11850222291

Telah dipertahankan didepan sidang dewan penguji
Sebagai salah satu syarat untuk memperoleh gelar Sarjana Teknik
Fakultas Sains dan Teknologi Universitas Sultan Syarif Kasim Riau
di Pekanbaru, pada tanggal 20 Juli 2022

Pekanbaru, 20 Juli 2022
Mengesahkan,

Dekan	Ketua Jurusan
Dr. Hartono, M.Pd	**Misra Hartati, S.T., M.T**
NIP : 196403011992031003	NIP : 198205272015032002

DEWAN PENGUJI

Ketua	:	Sarbaini, S.Si., M.Si
Sekretaris I	:	Nazaruddin, S.ST., M.T
Anggota I	:	Muhammad Rizki, M.T, M.B.A
Anggota II	:	Fitriani Surayya Lubis, S.T., M.Sc

Lampiran Surat :
Nomor   : Nomor 25/2022
Tanggal   : 20 Juli 2022

SURAT PERNYATAAN

Saya yang bertanda tangan di bawah ini :

Nama   : Mutia Anggraini

NIM   : 11850222291

Tempat/Tanggal Lahir : Bukittinggi, 07 Oktober 1999

Fakultas   : Sains dan Teknologi

Prodi   : Teknik Industri

Judul Skripsi   : Usulan Perbaikan Sistem Pengendalian Bahan Baku Keripik dengan Metode Continuous Review System dan Periodic Review System

(Studi Kasus : UKM Tungku Sanjai Minang Maimbau)

Menyatakan dengan sebenar-benarnya bahwa :

1. Penulisan skripsi ini berdasarkan hasil penelitian dan pemikiran saya sendiri.
2. Semua kutipan sudah disebutkan sumbernya.
3. Oleh karena itu skripsi saya ini, saya nyatakan bebas plagiat.
4. Apabila dikemudian hari ditemukan plagiat pada skripsi saya tersebut, maka saya bersedia menerima sanksi sesuai peraturan perundang-undangan.
5. Dengan demikian surat ini saya buat dengan penuh kesadaran dan tanpa paksaan dari pihak manapun juga.

Pekanbaru, 20 Juli 2022
Yang membuat pernyataan,

Mutia Anggraini
NIM. 11850222291

LEMBAR HAK ATAS KEKAYAAN INTELEKTUAL

Tugas Akhir yang tidak diterbitkan ini terdaftar dan tersedia di Perpustakaan Universitas Islam Negeri Sultan Syarif Kasim Riau adalah terbuka untuk umum dengan ketentuan bahwa hak cipta pada penulis. Referensi kepustakaan diperkenankan dicatat, tetapi pengutipan atau ringkasan hanya dapat dilakukan seizin penulis dan harus disertai dengan kebiasaan ilmiah untuk menyebutkan sumbernya.

Penggandaan atau penerbitan sebagian atau seluruh Tugas Akhir ini harus memperoleh izin dari Dekan Fakultas Sains dan Teknologi Universitas Islam Negeri Sultan Syarif Kasim Riau. Perpustakaan yang meminjamkan Tugas Akhir ini untuk anggotanya diharapkan untuk mengisi nama, tanda peminjaman dan tanggal pinjam.
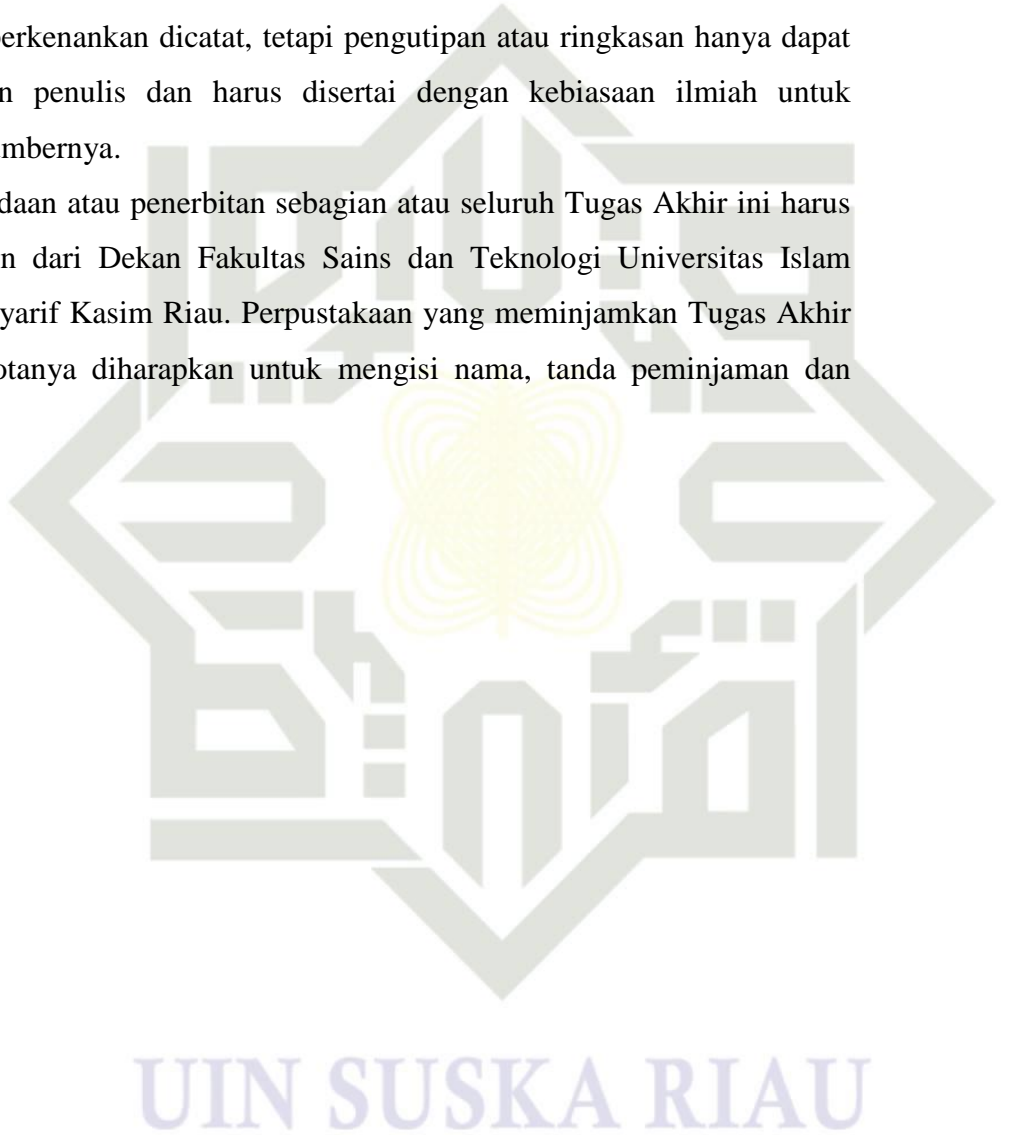
LEMBAR PERNYATAAN

Dengan ini saya menyatakan bahwa dalam Tugas Akhir ini tidak terdapat karya yang pernah diajukan untuk memperoleh gelar kesarjanaan di suatu Perguruan Tinggi, dan sepanjang pengetahuan saya juga tidak terdapat karya atau pendapat yang pernah ditulis atau diterbitkan oleh orang lain kecuali yang secara tertulis diacu dalam naskah ini dan disebutkan didalam daftar pustaka.

Pekanbaru, Juli 2022
Yang membuat pernyataan,

Mutia Anggraini
11850222291

LEMBAR PERSEMBAHAN

Dengan menyebut nama Allah yang maha pengasih lagi maha penyayang

Maka apabila kamu telah selesai (dari sesuatu urusan), kerjakanlah dengan sungguh-sungguh (urusan) yang lain dan hanya kepada Robbmulah hendaknya kamu berharap".

(Q.S Al-Insyirah ayat: 7-8)

Alhamdulillahirabbil alamin.

Tetes keringat yang membasahi asa, ketakutan yang memberatkan langkah, tangis keputus asaan yang sulit dibendung, dan kekecewaan yang pernah menghiasi hari-hari kini menjadi tangisan penuh kesyukuran dan kebahagiaan yang tumpah dalam sujud panjang. Alhamdulillah maha besar Allah, sembah sujud sedalam qalbu hamba haturkan atas karunia dan rizki yang melimpah, kebutuhan yang tercukupi, dan kehidupan yang layak.

Ku persembahkan usaha dan tulisanku......
Kepada kedua orang tuaku, Ayah (Niswardi), Mama (Felma Yenti) dan Abang (Muhammad Arif) yang telah mendoakanku, menafkahiku, memberi semangat, dan kasih sayang serta pengorbanan yang tidak akan mampu untuk ku membalasnya sampai kapan pun sehingga aku kuat menghadapi segala sesuatu.

Terimakasih kepada kalian semua

Pekanbaru, Juli 2022

Mutia Anggraini

Proposed Improvements to The Chip Raw Material Control System Using the Continuous Review System and Periodic Review System Methods

Mutia Anggraini
Student
Universitas Islam Negeri Sultan Syarif Kasim Riau
Pekanbaru, Indonesia
11850222291@students.uin-suska.ac.id

Nazaruddin
Asistant Professor
Universitas Islam Negeri Sultan Syarif Kasim Riau
Pekanbaru, Indonesia
nazar.sutan@uin-suska.ac.id

Muhammad Rizky
Asistant Professor
Universitas Islam Negeri Sultan Syarif Kasim Riau
Pekanbaru, Indonesia
muhammad.rizky@uin-suska.ac.id

Fitriani Surayya Lubis
Asistant Professor
Universitas Islam Negeri Sultan Syarif Kasim Riau
Pekanbaru, Indonesia
fitriani.surraya.l@uin-suska.ac.id

Abstract

Each region has its characteristics of traditional food, snacks, and drinks. One example of traditional processed products is generally made from raw materials of tubers such as cassava and sweet potatoes and also processed from fruits and flour (Sari and Nurrizati, 2018). Through optimal inventory control, companies can meet consumer needs on time and minimize the cost of raw material inventory to achieve company goals (Lahu, E.R., 2017). This research focuses on controlling the inventory of raw materials for chips, which will later be useful for minimizing inventory costs to affect the company's benefits. The purpose of this study is to describe raw materials inventory by determining the number of ordering lots and calculating the optimum total inventory cost for the company. The method used is a continuous review system and a periodic review system by collecting data related to the cost of raw material inventory at the UKM Tungku Sanjai Minang Maimbau. The results obtained are the total cost of raw material inventory, the optimal order lot size of raw materials by comparing the Q and P methods, and the total cost of raw material inventory. The calculation of the two methods is then compared to get the best method for controlling the inventory of chip raw materials.

Keywords
Material Inventory, Inventory Cost, Continuous Review System, Periodic Review System

1. Introduction

The level of inventory in the company's large raw material storage warehouse (*Inventory*) can cause major problems because on the other hand the company must prepare funds for the purchase of inventory and maintain the quality of raw materials and the possibility of damage and loss of raw materials. On the other hand, inventory anticipation can reduce inventory costs, which will risk a shortage of raw materials if there is a surge in demand from consumers. The business activities of making cryptic snacks at the Sanjai Minang Maimbau Furnace started from buying raw materials from *suppliers* in the Pua River area then the products were processed and marketed to consumers inside and outside the province. The Sanjai Minang Maimbau Furnace business produces 12 kinds of chips with 4 main raw materials, namely cassava / sweet potatoes, taro, potatoes and bananas. Based on an interview conducted by the owner of the Sanjai Minang Maimbau Furnace UKM, data on the sale of sanjai chips from April 2021 to March 2022 can be seen in the table below.

Table 1. Sanjai Chips Sales Data for April 2021- March 2022

Date	Sales (Kg)
April 2021	536
May 2021	320
June 2021	210
July 2021	317
August 2021	200
September 2021	318

In its activities, this business only carries out processing based on previous experience and does not yet have a certain method. The condition *of overstock* of raw materials at this enterprise is due to non-fixed and capricious consumer demand.over time. This condition can cause the cost of inventory incurred by the company to increase.From the results of observations that have been made, there is damage to raw materials such as cassava and bananas which indicates an error in controlling raw material inventory which ultimately causes losses to the company. The selection of the two methods, namely the *continious review system* and *periodic review system* methods, is based on companies that have an uncertain amount of raw material demand according to consumer needs, resulting in variations in the purchase of raw materials. Therefore, research is needed to determine inventory control methods that are expected to help the Sanjai Minang Maimbau Furnace business in regulating the supply of sanjai raw materials in order to minimize costs.

1.1 Objectives

Sanjai Minang Maimbau Furnace UKM is a business engaged in the manufacture of sanjai chips or traditional snacks made from tubers and fruits. This business has been established since 1994. This home business is located on Jl. Sanjai, Manggis Ganting Village, Mandiangin Koto Selayan District, Bukittinggi City, West Sumatra

2. Literature Review

(Axsäter, 2015) Market demand is volatile or unstable so good inventory planning is needed. This study aims to determine a good probabilistic inventory model used in determining the quantity of orders taking into account the total minimal costs. (Aryanny & Kurniawan, 2020) Determine bowl for gravel pump warman housing parts inventory control annually to minimize inventory costs. Inventory control methods used periodic review (R,S), Periodic Review (R,s,S), Continuous Review (s,Q) and Continuous Review (s,S). These four methods are compared with the enterprise method and selected methods with a minimum total cost. Industries that use make-to-stock production methods depend on inventories to adapt to changing demand. The precision of customer demand estimation becomes crucial. Overstock or stock out results from improper inventory management. On businesses involved in the automobile industry, this research was done. To determine the best inventory system policy, this study sets out to find it. A low inventory cost and low order cost can be used by the ideal inventory system to generate order volumes to assist the fulfillment of consumer demand (Rizkya et al., 2018). High costs occur from excess product inventory, while damage and expiry result from storing stock for an extended period of time. This retail business sells high-quality goods and offers a variety of superb and comprehensive goods, making it simpler for clients to pick the finest solution for their requirements (Kholil, 2022). In order to minimize inventory-related costs and maximize service levels with a considerable decrease in treatment costs and resource wastage, inventory management in a healthcare system must be consistent with its operations and important characteristics. Researchers and practitioners have created a variety of tools and approaches over the years to model and analyze different inventory management systems in the healthcare industry while taking these factors into account(Saha & Ray,

2019). To find the best ordering lots and reorder points, inventory planning methods with continuous review and periodic review approach were contrasted. Additionally, inventory rules were looked at, including service level, safety stock, ordering costs, holding costs, and cost resulting from potential shortages. The findings indicated that continuous review is preferable to periodic review for this specific issue(Toha et al., 2019).

3. Methods
This research methodology describes each activity carried out during the conduct of the study as a whole.

3.1 Preliminary Studies
A preliminary study was carried out in order to find out the problems that exist in the Sanjai Minang Maimbau Furnace UKM at this time, so that an overview of the problems to be studied is obtained.

3.2 Problem Identification
Based on the identification of the problem, the cause of the problem can be known by planning the inventory of raw materials. The inventory of raw materials so far has been less than optimal, causing the amount of raw material inventory to often experience overstock and stock out, causing the cost of raw material inventory to be not minimal which can cause disruption of the production process and have an impact on profits at the Sanjai Minang Maimbau Furnace SMEs.

3.3 Problem Formulation
Based on the identification of problems that have been carried out, it can be formulated which method is the most appropriate among the *continuous review system* and *periodic review system* methods used by the Sanjai Minang Maimbau Furnace UKM?. The formulation of this problem is also the focus of observation in the later research process

3.4 Research Goal Setting
The purpose of this study is to describe the inventory system of cryptic raw materials, determine the number of ordering lots, calculate the total cost of inventory and compare the control of cryptic raw materials through the *continuous review system* and *periodic review system* methods in order to optimize inventory costs..

4. Data Collection
This research the data needed are primary data and secondary data, namely:

4.1 Primary Data
Primary data is data obtained from the results of direct observations at the Sanjai Minang Miambau Furnace UKM and asking for information and interviewing employees who are directly involved. The data obtained is the data of the production process carried out by the company

4.2 Secondary Data
Secondary data is data that is not directly observed by the researcher or obtained from existing sources, namely data obtained from within the company. This data is a company profile, company production data, raw material needs and purchase data, lead time data, message cost data, storage cost data, and raw material shortage cost data, all this data is needed for the purposes of the analysis process of problems that exist in raw material inventory at the Sanjai Minang Maimbau Furnace SMEs.

5. Results and Discussion
From the results of data collection by means of interviews and observations, it was found that the Sanjai Minang Maimbau Furnace UKM did not have a certain inventory control method in determining the order time and the size of the ordering lot for chip raw materials. The following is data on the purchase, inventory and use of raw materials which are then calculated to obtain the total inventory costs incurred by the company.

5.1 Cost of Ordering Raw Materials
Based on the information obtained from the SME Furnace sanjai Minang Maimbau, the cost of ordering and the cost of saving from raw materials are as follows:

Booking fee = Base rate x phone duration
          = IDR 1.125 x 10 minutes
          = IDR 11.250,-/ message

Administrative Costs on the process of ordering raw materials for chips come from the cost of making proof of receipt and other unforeseen costs that are usually always incurred when an order is placed. IDR. 20.000/message

3. The message fee is obtained from the sum of the telephone fee of IDR 11,250, the administrative fee of IDR 20,000, and the transportation fee of IDR 100,000, so that the total message cost is IDR 131,250

5.2 Cost of Storing Raw Materials
Storage costs are costs incurred by a company to finance the inventory of raw materials stored in the warehouse. Storage cost data in this study includes labor costs, electricity costs and warehouse maintenance costs.
1. Warehouse labor costs
   The workforce working at the Sanjai Minang Maimbau Furnace UKM in the raw material warehouse section is as many as 1 worker with a wage of IDR 1,800,000 per month.
   Labor costs = IDR 1.800.000/month x 12 months
             = IDR 21.600.000,-/year
2. Electricity Usage Fee is Rp 570.720,-/year
3. Warehouse Maintenance Cost is IDR 450,000
   So that the total storage costs are obtained from the sum of warehouse labor costs, electricity usage costs, and warehouse maintenance costs, which are IDR 22,620,720

5.2 *Lead Time* Data
The lead time at the Sanjai Minang Maimbau Furnace UKM is two days until the raw materials arrive at the warehouse. With the number of working days each year 292 working days. Then the calculation of *lead time* is as follows:

$Lead\ Time = \frac{2}{292} = 0,0068$

The cost of shortage occurs if the consumer's order cannot be fulfilled which leads to loss of income. Table 2 there is an cost of shortage of chip raw materials in SME Furnace Sanjai Minang Maimbau..

Table 2. Cost of Lack of Raw Materials

No	Raw Material	Shortage Cost
1.	Cassava/Yam	IDR 2.200
2.	Taro	IDR 2.500
3.	Potato	IDR 2.600
4.	Banana	IDR 2.000

5.3 Data Processing
The data processing that will be carried out is to determine the planning of controlling chip raw materials and calculating the costs of raw material control using the *Continuos Review System (Q)* and *Periodic Review System (P)* methods. The following are the stages of processing such data:

5.3.1 Actual Condition of Raw Materials in Sanjai Minang Maimbau Furnace SMEs
The following is data on the purchase, inventory and use of raw materials which are then calculated to obtain the total inventory costs incurred by the company can be seen in the table below:
The size of ordering raw material products by the company's method is calculated by adding up the cost of ordering per product, the cost of storing and the total cost of inventory, which is as follows
1. Inventory costs incurred by the company for cassava raw materials from April 2021 to March 2022 in Table 3.

© IEOM Society International

Tabel 3. Order size of Cassava Products by Company Method

Moon	Purchase (sak)	Use (sak)	Supplies (sak)	Message Fee	Save Costs
March			30		
April	260	245	45	IDR 262,500	IDR 87,255
May	300	410	-65	IDR 393,750	IDR 0
June	400	325	10	IDR 262,500	IDR 19,390
July	260	215	55	IDR 262,500	IDR 106,645
August	100	160	-5	IDR 393,750	IDR0
September	200	185	10	IDR 262,500	IDR 19,390
October	300	200	110	IDR 262,500	IDR 213,290
November	200	315	-5	IDR 393.750	IDR0
December	400	346	49	IDR 262.500	IDR 95.011
January	260	286	23	IDR 262.500	IDR 44.597
February	340	342	21	IDR 262.500	IDR 40.719
March	200	220	1	IDR 262.500	IDR 1.939
Total				IDR3.543.750	IDR 628.236

Message Cost + Storage Cost +Total Purchase (Raw Material Price (Sak) x Total Purchase of Cassava)
IDR 3,543,750 + IDR 628,236 + IDR 515,200,000
= RP519.371.985,-

The inventory costs incurred by the company for taro raw materials are as follows::
Message Cost + Storage Cost +Total Purchase (Raw Material Price (Sak) x Total Purchase of Taro)
IDR 3,150,000 + IDR 982,566 + IDR 576,000,000
IDR 580.132.566,-

The inventory costs incurred by the company for potato raw materials are as follows:
Message Cost + Storage Cost +Total Purchase (Raw Material Price (Sak) x Total Purchase of potatoes)
IDR 3,410,500 + IDR 346,723 + IDR 834,000,000
IDR837.757.223,-

The inventory costs incurred by the company for banana raw materials are as follows:
Order Cost + Saving Cost +Total Purchase (Raw Material Price (Sak) x Total Purchase of bananas)
IDR 3,150,000 + IDR 930,720 + IDR 728,000,000
IDR732.080.720,-

Tabel 4 Recapitulation of Actual Condition Raw Material Inventory Costs

No.	Types of Raw Materials	Inventory Costs
1.	Cassava/Yam	IDR 518.190.736,-
2.	Taro	IDR 580.132.566,-
3.	Potato	IDR 837.757.223,-
4.	Banana	IDR732.080.720,-
	Total	IDR2.688.161.245,-

Total inventory costs include message costs and storage costs. So that the total inventory costs incurred by the company are IDR 2,688,161,245,-.

5.4 *Continuous Review System* (Q) Method

By using this method, every time the use of raw material inventory is carried out, the amount of available inventory must be calculated to determine whether reordering is or not necessary to do so. The *Continuous Review*

System (Q) method has several steps to get optimal ordering results. The steps using the Q method for the calculation of chip raw materials in the Sanjai Minang Maimbau Furnace UKM are as follows:

5.4.1 Calculation of Method Q on Cassava

The calculation of the Continuous Review System method on the supply of cassava raw materials is as follows :

Annual Demand (D) = 3,249 sak/year
Lead time (L) = 0.0068
Fee per time booking (A) = IDR 131.250/order
Inventory shortage cost (Cu) = IDR 2,200/sak
Storage cost per unit (h) = IDR 1,939/sak
Raw material price per sak (P) = IDR 160.000/sak

Determine the average needs

$$\overline{X} = \frac{\Sigma\, xi}{n}$$
$$\overline{X} = \frac{3249}{12}$$
$$\overline{X} = 271 \text{ sak}$$

Calculating the standard deviation

$$\sigma = \sqrt{\frac{\Sigma(Xi-X)^2}{n-1}}$$
$$\sigma = \sqrt{\frac{\Sigma(Xi-X)^2}{n-1}}$$
$$\sigma = \sqrt{\frac{\Sigma(245-271)^2+(410-271)+(325-271)+\cdots+(220-271)}{12-1}}$$
$$\sigma = \sqrt{\frac{66235}{11}}$$
$$\sigma = 77{,}5974$$

Determine the size of the ordering lot

$$q_{01} = \sqrt{\frac{2\,AD}{h}}$$
$$q_{01} = \sqrt{\frac{2\,(131.250)(3.249)}{1.939}}$$
$$= 663{,}209 \approx 663 \text{ sak}$$

Determine the magnitude of the value of inventory shortages ( ) or the possible occurrence of deficiencies using the following formula:

$$\alpha = \frac{hq01}{CuD + hq01}$$
$$\alpha = \frac{(1.939)(663)}{(2.200)(3.249) + (1.939)(663)}$$
$$\alpha = 0{,}1524$$

Based on the normal distribution table of 0.1524 has a value of Z of 1. Next look for r1 which is as follows:

r1 = DL + Zα S√L
r1 = (3.249)(0,0068) + (1)(77,5974)√0,0068
r1 = 22,0932 + 77,5974 √0,0068
r1 = 28,49 sak ≈ 29 sak

Based on Table B Values f(Z i.e. 0.2420 and value (Z α) *yaitu* 0,0833. So calculating q02 adalah is as follows:

$$q_{02} = \sqrt{\frac{2D\,[\,A + Cu \int_{r1}^{\infty}(x-r1)\,f(x)dx}{h}}$$

Where:

$$N = \int_{r1}^{\infty}(x - r1)\,f(x)dx = SL\,[f(Z\alpha) - Z\alpha\,\psi(Z\alpha)]$$
N = 77,5974√0,0068[0,2420-1(0,0833)]
N = 77,5974√0,0068[0,1587]
N = 1,0154

So that:

$$q02 = \sqrt{\frac{2(3249)[131.250+2.200(1,0154)]}{1.939}}$$

q02 = 668 sak

Recalculate α and r2

$$\alpha = \frac{hq02}{CuD+hq02}$$

$$\alpha = \frac{(1.939)(668)}{(2.200)(3.249)+(1.939)(668)}$$

$$\alpha = 0,153$$

Based on the normal distribution table of 0.153 has a Z value of 1. Then the value of r2 is as follows:

$$r2 = DL + Z\alpha\ S\sqrt{L}$$

$$r2 = (3.249)(0,0068)+(1)(77,5974)\ \sqrt{0,0068}$$

$$r2 = 28,49\ sak \approx 29\ sak$$

After obtaining the values of r1 and r2, then the results of both are compared. If the results of the two are relatively the same then r=r1 and q0=q02. So r1=r2= 29 sak and q01=q02 =668 sak

Calculation of total costs

$$O_T = D_p+\frac{AD}{q0}+h\ (\frac{1}{2}q_{0+r-DL}) + (\frac{CuDN}{q0})$$

$$O_T = 3.249(160.000)+\frac{(131.250)(3.249)}{668}+1.939(\frac{1}{2}668+29-(3.249)(0,0068))+(\frac{(2.200)(3.249)(1,0154)}{668}$$

$$O_T = 519.840.000+638.370+661.018+10.865$$

$$O_T = Rp521.150.253$$

The recapitulation of the calculation of the ordering lot size and inventory costs of all types of chip raw materials at the Sanjai Minang Maimbau Furnace UKM using the continuous review system method can be seen in the table below

Table 5 Recapitulation of *Calculation of Continuous Review System* Method

No.	Types of Raw Materials	q (sak)	r (sak)	Inventory Costs
1.	Cassava/Yam	668	29	IDR 521.150.253
2.	Taro	628	25	IDR 574.828.241
3.	Potato	619	23	IDR 840.607.581
4.	Banana	614	23	IDR 716.198.301
Total				IDR 2.652.784.376

Based on Table 5, it can be seen *that the size of the order lot* for each type of chip raw material and the cost of inventory using the *Continuous Review System* method is IDR 2,652,784,376.

5.5 *Periodic Review System* (P) Method

The *periodic review system* method is a method of controlling inventory that is checked *periodically* every one certain period of time. Bookings are made with a booking amount that varies with a fixed booking period. The steps in the *periodic review system* method for calculating the type of chip raw materials are as follows:

5.5.1 Calculation of Method P on Cassava/Yam

The calculation of the periodic review system method on the supply of cassava / sweet potato raw materials is as follows:

Annual Demand (D) =3,249 sak/year
Lead time (L) =0.0068
Fee per time booking (A) = IDR 131.250/order
Inventory shortage cost (Cu) = IDR 2,200/sak
Storage cost per unit (h) = IDR 1,939/sak
Raw material price per sak (P) = IDR 160.000/sak

1. Calculating the T Value

$$T = \sqrt{\frac{2\ x\ A}{Dh}}$$

$$= \sqrt{\frac{2\,(131.250)}{(3.249)(1.939)}}$$

$$= \sqrt{\frac{262.500}{6.299.811}}$$

$$= \sqrt{0,041}$$

T = 0,2025 tahun atau 73,91 days rounded to 74 days

2. Calculate α

$$\alpha = \frac{T.h}{Cu}$$

$$\alpha = \frac{(0,2025)(1.939)}{2:200}$$

$\alpha = 0,1785$

3. Based on the normal distribution table α of 0,1785 has a value of $Z\,\alpha$ sebesar 0,95. The value of $f(Z\,\alpha)$ is 0,2541 and value $\psi(Z\,\alpha)$ i.e 0,0916. Next calculate the value of R (maximum inventory)

$R = D\,(T+L) + Z\,\alpha\,\sqrt{T+L}$

$R = 3.249\,(0,2025+0,0068) + 0,95\sqrt{0,2025+0,0068}$

$R = 3.249\,(0,2093) + 0,4346$

$R = 680$ sak

4. Calculating the probability of *occurrence of a shortage* (N)

$N = S\sqrt{T+L}\ (F_{(Z\alpha)} - (Z\,\alpha \times \varphi_Z\alpha))$

$N = 77,5974\sqrt{0,2025+0,0068}\ (0,2541 - (0,95 \times 0,0916))$

$N = 35,5003 \times 0,1644$

$N = 5,835$

Calculate the total cost

$O_T = D_p + \frac{A}{T} + h(R - D_L + \frac{DT}{2}) + (\frac{CuN}{T})$

$O_T = (3.249)(160.000) + \frac{131.250}{0,2025} + 1.939\,(680 - (3.249)(0,0068))$

$\quad + (\frac{(3.249)(0,2025)}{2}) + (\frac{(2.200)(5,835)}{0,2025})$

$O_T = 519.840.000 + 648.148 + 1.913.537 + 63.393$

$O_T = 522.465.078$

The same calculation is also carried out to calculate the cost of inventory of raw materials for taro, potatoes and bananas using the periodic review system method.

Tabel 6 Recapitulation of Calculations Periodic review system method

No.	Types of Raw Materials	R (sak)	T (Year)	Days	Inventory Costs
1.	Cassava/Yam	680	0,2025	74	IDR 522.465.078
2.	Taro	642	0,2168	79	IDR 576.076.366
3.	Potato	632	0,2190	80	IDR 841.826.038
4.	Banana	629	0,2218	81	IDR 717.412.737
	Total				IDR 2.657.780.219

Based on Table 6, it can be seen that the maximum inventory (R), order time (T) and inventory cost of chip raw materials with *the periodic review system* method are IDR 2,657,780,219..

5.5.2 Comparison of Total Inventory Costs Between the Actual Condition of *the Continuous Review System* Method and *the Periodic Review System* Method

The results of the recapitulation of the comparison of the total cost of raw material inventory between actual conditions, *the continuous review system* (CRS) method and *the periodic review system* (PRS) can be seen in the table below. A comparison of the total cost of availability between the actual condition of the company, *the continuous review system* and *the periodic review system* can be seen in figure 7.

Table 7 Recapitulation of Actual Inventory Cost Comparison, CRS Method and PRS Method

No.	Types of Raw Materials	Current	CRS method	PRS method
1	Cassava/Yam	IDR519.371.985	IDR 521.150.253	IDR 522.465.078
2	Taro	IDR580.132.566	IDR 574.828.241	IDR 576.076.366
3	Potato	IDR837.757.223	IDR 840.607.581	IDR 841.826.038
4	Banana	IDR732.080.720	IDR 716.198.301	IDR 717.412.737
	Total	IDR2.669.342.494	IDR2.652.784.376	IDR2.657.780.219

Below is a comparison chart between the total cost of supplying raw materials for chips in the Sanjai Minang Maimbau Furnace UKM
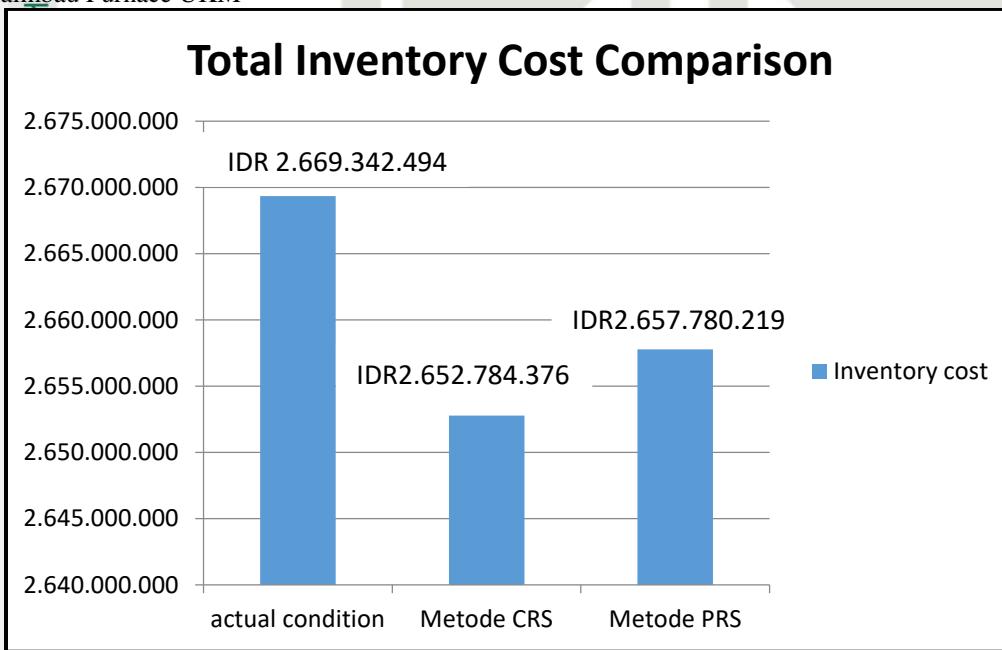

Figure 1 Comparison of Total Raw Material Inventory Costs

Based on the chart above, you can see the results of the recapitulation of the comparison of actual inventory costs, *the continuous review system* method and *the periodic review system* method. The calculation results show that the method that has the lowest cost is the *continuous review system* method of IDR 2,652,784,376. So that the company using the *continuous review system* method in controlling the inventory of chip raw materials can save inventory costs of IDR 16,558,118.

6 Conclusion

The conclusions from the results of the research that have been carried out are as follows:

1. The supply of raw materials for chips at the UKM Tungku Sanjai Minang Maimbau often experiences overstock and stockouts. As in the raw material for cassava/yam, the company experienced a shortage of raw materials or stockout in May 2021, namely -65 sacks, August 2021 and November, namely -5 sacks. Banana raw materials also experienced overstock in January 2022 and February 2022, resulting in bananas being damaged due to being stored in the warehouse for too long this resulted in disruption of the production process for making chips. company can increase.

2. he results of the calculation show that the most optimal number of order lot sizes is using the continuous review system (Q) method where the total inventory cost is more efficient than the company's method and the periodic review system (P) method. For cassava/yam raw materials, the order time follows the reorder value of 29 sacks, for taro the reorder value is 25 sacks, for potatoes the reorder value is 23 sacks and for niali bananas the reorder value is 23 sacks

3. The actual total cost of inventory at the SME Furnace Sanjai Minang Maimbau is IDR.2,669,342,494 which is obtained from the sum of the inventory costs in one year for raw materials for cassava/sweet potato, IDR 519,371,985, taro IDR.580,132,566, potatoes IDR 837,757,223 and bananas IDR 732. 080.720. To minimize the company's inventory costs, calculations are carried out using the continuous review system (Q) and periodic review system (P) methods where the calculations that have been carried out show that the continuous review system (Q) method produces the minimum total inventory cost of IDR 2,652,784,376. obtained from the sum of the cost of supplying raw materials for cassava/yam IDR 521,150,253, taro IDR 574,828,241, potatoes IDR 840,607,581 and bananas IDR 716,198,301

4. By calculating the inventory control of raw materials for chips at UKM Tungku Sanjai Minang Maimbau using the continuous review system (Q) and periodic review system (P) the total cost of raw material inventory can be minimized if using the continuous review system (Q) method, which is equal to IDR.2,652,784,376 compared to the periodic review system (P) which is IDR 2,657,780,219, while using the company's policy it is IDR 2,669,342,494. So from the results of the total cost of inventory using the continuous review system (Q) method, it can save 0.62% or around IDR 16,558,118. So that the best inventory method in making decisions for controlling the inventory of raw materials for chips in UKM Tungku Sanjai Minang Maimbau is if the company uses the continuous review system (Q) method.

References

Acevedo, D., Yang, X., Liu, Y. C., O'Connor, T. F., Koswara, A., Nagy, Z. K., Madurawe, R., & Cruz, C. N. (2019). Encrustation in continuous pharmaceutical crystallization processes—a review. *Organic Process Research & Development*, *23*(6), 1134–1142.

Aditya, I., Simaremare, A. A., & Hudaya, C. (2019). Study of Coal Inventory Planning Analysis in a Coal-Fired Power Plant Using Continuous and Periodic Review. *2019 IEEE 2nd International Conference on Power and Energy Applications (ICPEA)*, 33–36.

Aryanny, E., & Kurniawan, Y. D. (2020). Analisis pengendalian persediaan suku cadang housing gowl for gravel pump warman dengan metode periodic review dan continuous review di PT. XYZ. *Tekmapro: Journal of Industrial Engineering and Management*, *15*(1), 13–24.

Axsäter, S. (2015). *Inventory control* (Vol. 225). Springer.

Chan, D. Y., & Vasarhelyi, M. A. (2018). Innovation and practice of continuous Auditing1. In *Continuous Auditing*. Emerald Publishing Limited.

Ciarallo, F. W., Akella, R., & Morton, T. E. (1994). A periodic review, production planning model with uncertain capacity and uncertain demand—optimality of extended myopic policies. *Management Science*, *40*(3), 320–332.

Cobo, S., Dominguez-Ramos, A., & Irabien, A. (2018). From linear to circular integrated waste management systems: A review of methodological approaches. *Resources, Conservation and Recycling*, *135*, 279–295.

Kaur, M., Singh, K., & Singh, D. (2019). Synergetic success factors of total quality management (TQM) and supply chain management (SCM): A literature review. *International Journal of Quality & Reliability Management*.

Kholil, M. (2022). Inventory Control of Vegetable Oil Products Using Continuous Review System (Q) Approach and Periodic Review System (P) Methods in Retail Companies: A Case Study of Indonesia. *International Journal of Scientific and Academic Research (IJSAR), EISSN: 2583-0279*, *2*(4), 11–16.

Kim, J., Oh, J., & Lee, H. (2019). Review on battery thermal management system for electric vehicles. *Applied Thermal Engineering*, *149*, 192–212.

Kurniawan, S., Saragih, M. H., & Angelina, V. (2022). Inventory Control Analysis with Continous Review System and Periodic Review System Methods at PT. XYZ. *Business Economic, Communication, and Social Sciences (BECOSS) Journal*, *4*(2), 95–107.

Lim, J., Kim, H., & Park, Y. (2018). Review of the regulatory periodic inspection system from the viewpoint of defense-in-depth in nuclear safety. *Nuclear Engineering and Technology*, *50*(7), 997–1005.

Rizkya, I., Syahputri, K., Sari, R. M., Siregar, I., & Ginting, E. (2018). Comparison of Periodic Review Policy and Continuous Review Policy for the Automotive Industry Inventory System. *IOP Conference Series: Materials Science and Engineering*, *288*(1), 12085.

Saha, E., & Ray, P. K. (2019). Modelling and analysis of inventory management systems in healthcare: A review and reflections. *Computers & Industrial Engineering*, *137*, 106051.

Sherbrooke, C. C. (1968). METRIC: A multi-echelon technique for recoverable item control. *Operations Research*, *16*(1), 122–141.

Toha, M., Prastyo, D. E., & Saptari, A. (2019). A Comparison of Continuous and Periodic Review on Inventory Components of Dump Trucks. *2019 International Conference on Sustainable Engineering and Creative Computing (ICSECC)*, 364–368.

Zhang, N., Yuan, Y., Cao, X., Du, Y., Zhang, Z., & Gui, Y. (2018). Latent heat thermal energy storage systems with solid–liquid phase change materials: a review. *Advanced Engineering Materials*, *20*(6), 1700753.

Biography

Mutia Anggraini born in Bukittinggi on October 7, 1999. The daughter of Niswardi and Felma Yenti, she is the 2nd child of 2 siblings. Started education in 2005 at TK ASAS Bukittinggi, for 1 year then in 2006 continued to SDN 16 Campago Ipuah Bukittinggi for 6 years and in 2012 continued to SMPN 4 Bukittinggi, and in 2015 continued his education to SMAN 2 Bukittinggi and completed his education in 2018. In 2018 the author continued his education at UIN SUSKA RIAU Faculty of Science and Technology, Department of Industrial Engineering.

Nazaruddin is assistant professor Industrial Engineering Departement at Sultan Syarif Kasim State Islamic University, Indonesia

Muhammad Rizki is assistant professor Industrial Engineering Departement at Sultan Syarif Kasim State Islamic University, Indonesia

Fitriani Surayya Lubis is assistant professor Industrial Engineering Departement at Sultan Syarif Kasim State Islamic University, Indonesia

LETTER OF ACCEPTANCE

June 24, 2022

Mutia Anggraini, Universitas Islam Negeri Sultan Syarif Kasim Riau
nazaruddin nazaruddin, Universitas islam negeri sultan syarif kasim

Subject: Letter of Acceptance – 3rd South American IEOM Paraguay Conference

ID 371: Proposed Improvements to The Chip Raw Material Control System Using the Continuous Review System and Periodic Review System Methods

Dear Authors:

On behalf of the organizing committee, we are delighted to inform you that your abstract has been accepted for oral presentation and publication at the 3rd South American International Conference on Industrial Engineering and Operations Management in Paraguay during July 19-21, 2022. Host is Asuncion National University, Paraguay. The conference provides a forum for academics, researchers, and practitioners to exchange ideas and recent developments in the field of industrial engineering, systems engineering, manufacturing engineering, operations research, engineering management, supply chain, logistics and operations management. The event will advance theory and practice by fostering networking, collaboration, and joint effort among the conference participants. Proceeding papers (double peer review) will be indexed in SCOPUS and EBSCO. Proceedings full papers (double peer review) will be indexed in SCOPUS.

IEOM Society has become a premier international platform and forum for academics, researchers, scientists, and practitioners to exchange ideas and provide insights into the latest developments and advancements in the fields of Industrial Engineering and Operations Management. IEOM has successfully organized international conferences in Dhaka (2010), Kuala Lumpur (2011), Istanbul (2012), Bali (2014), Dubai (2015), Rome (2015), KL (2016), Detroit (2016), Rabat (2017), Bristol, UK (2017), Bogota (2017), Bandung (2018), Paris (2018), Washington DC (2018), Pretoria (2018), Bangkok (2019), Pilsen (2019), Toronto (2019), Riyadh (2019), Dubai (2020), Detroit (2020), Harare (2020), Singapore (2021), Sao Paulo (2021), Haiti (2021), Harbin (2021), Bangalore (2021), Surakarta (2021), Monterrey (2021), Istanbul (2022), and Nigeria (2022).

IEOM is expecting another exciting event in Paraguay. Some of the events and activities that are planned include: outstanding keynote speakers, global engineering education speakers, global supply chain & logistics, Industry 4.0, industry solutions, undergraduate and graduate student paper competitions, senior design competition and awards.

You will see the IEOM 2022 Paraguay Conference as a great value-added event. Your participation is highly appreciated. If you have any question, please contact Dr. Taufiq Islam, Operations Manager at info@ieomsociety.org.

We look forward to seeing you at the 2022 IEOM Paraguay Conference.

Regards,

Dr. Jorge Kurita, Conference Chair
Research Faculty
Department of Industrial
Engineering
Asuncion National University,
Paraguay

Dr. Ahad Ali
Conference Co-Chair
Associate Professor and Director of
Industrial Engineering Programs,
Lawrence Tech University,
Michigan, USA
Executive Director, IEOM Society

Prof. Vitor M. Caldana
Conference Program Chair
IFSP – Instituto Federal de
São Paulo
Campus Sorocaba
Sao Paulo, SP, Brazil

Prof. Don Reimer
Program Co-Chair
Director of Membership and
Chapters – IEOM Society and
President, The Small
Business Strategy Group
Detroit, Michigan, USA

Sponsors and Partners

IEOM Society International, 21411 Civic Center Dr., Suite # 205, Southfield, Michigan 48076, p. 1-248-450-5660, Email: info@ieomsociety.org

ATTENDANCE CERTIFICATE

IEOM Society International

The 3rd South American International Conference on
Industrial Engineering and Operations Management
Asuncion, Paraguay, July 18-21, 2022, Host: Asuncion National University

Attendance Certificate

This is to certify that

MUTIA ANGGRAINI

Student at Industrial Engineering, Universitas Islam Negeri Sultan Syarif Kasim, Indonesia

Attended the 3rd South American IEOM Paraguay Conference. The event includes keynotes, plenaries, global engineering education, global business management, global supply chain, industry solutions, panels, and technical sessions.

Dr. Jorge Kurita, Conference Chair
Research Faculty
Dept. of Industrial Engineering
Asuncion National University
Paraguay

Dr. Ahad Ali
Conference Co-Chair
Assoc. Professor and Director of IE
Lawrence Tech University, USA
Executive Director, IEOM Society

Prof. Vitor M. Caldana
Conference Program Chair
IFSP – Instituto Federal de
São Paulo. Sorocaba
Sao Paulo, SP, Brazil

Prof. Don Reimer
Program Co-Chair
Director of Membership and
Chapters – IEOM Society and
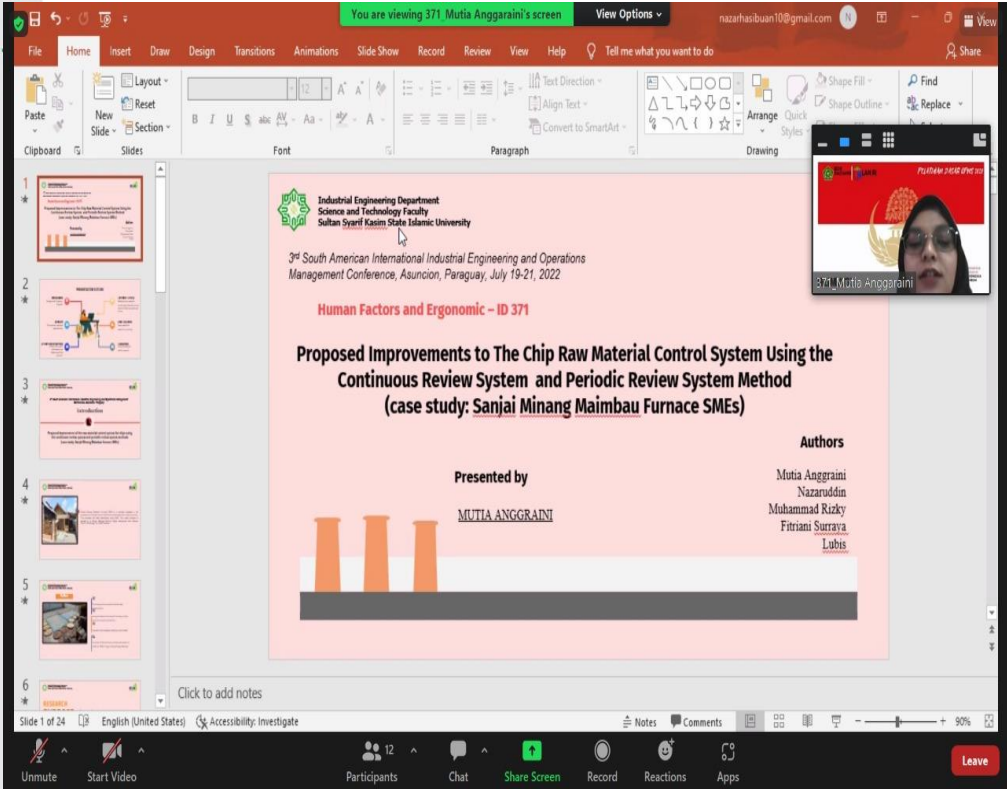Adjunct Prof. LTU, MI, USA

Sponsors and Partners

IEOM Society International, 21411 Civic Center Dr., Suite # 205, Southfield, Michigan 48076, USA, www.ieomsociety.org

CERTIFICATE OF PRESENTATION

IEOM Society International

The 3rd South American International Conference on
Industrial Engineering and Operations Management
Asuncion, Paraguay, July 18-21, 2022, Host: Asuncion National University

Certificate of Presentation

This is to certify that

Mutia Anggraini, Student, Universitas Islam Negeri Sultan Syarif Kasim Riau, Pekanbaru, Indonesia
Nazaruddin, Muhammad Rizky and Fitriani Surraya Lubis, Asistant Professor, Universitas Islam Negeri Sultan Syarif Kasim Riau, Pekanbaru, Indonesia

Delivered an Oral Presentation entitled "ID 371 Proposed Improvements to The Chip Raw Material Control System Using the Continuous Review System and Periodic Review System Methods." at the 3rd South American IEOM Paraguay Conference.

Dr. Jorge Kurita, Conference Chair
Research Faculty
Dept. of Industrial Engineering
Asuncion National University
Paraguay

Dr. Ahad Ali
Conference Co-Chair
Assoc. Professor and Director of IE
Lawrence Tech University, USA
Executive Director, IEOM Society

Prof. Vitor M. Caldana
Conference Program Chair
IFSP – Instituto Federal de
São Paulo. Sorocaba
Sao Paulo, SP, Brazil

Prof. Don Reimer
Program Co-Chair
Director of Membership and
Chapters – IEOM Society and
Adjunct Prof. LTU, MI, USA

Sponsors and Partners

IEOM Society International, 21411 Civic Center Dr., Suite # 205, Southfield, Michigan 48076, USA, www.ieomsociety.org

PRESENTATION PROOF