

# SCHEDULING PROCESS ANALYSIS DISTRIBUTION OF PRODUCT USING THE DISTRIBUTION REQUIREMENT PLANNING (DRP) METHOD

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## Abstarct

The research aims to analyze product distribution scheduling planning, create a more efficient product distribution scheduling system by using distribution requirement planning (DRP) method in PT. Nusa Abadi Commerce is a company engaged in distribution. The results of calculations using the company method with the DRP method. In the distribution period of 2019 it showed that the DRP method of Rp. 431,510,000, - and the company's method of Rp. 563,970,000, - so the company is able to save costs by Rp. 132,460,000, or 23.49% more efficient. The results of calculations using the company method with the DRP method. The distribution period in 2020 shows that the DRP method of Rp. 368,182,500 and company method of Rp. Rp. 450,840,000, - so the company is able to save costs by Rp. 82,657,500, - or the company is able to be more efficient 18.33%. Based on the results of research that has been done in 2019 to 2020 DRP method is consistently more efficient than the company's method, therefore the company is advised to use DRP in planning distribution activities for the future period.

**Keywords:** distribution, distribution requirement planning, forecasting

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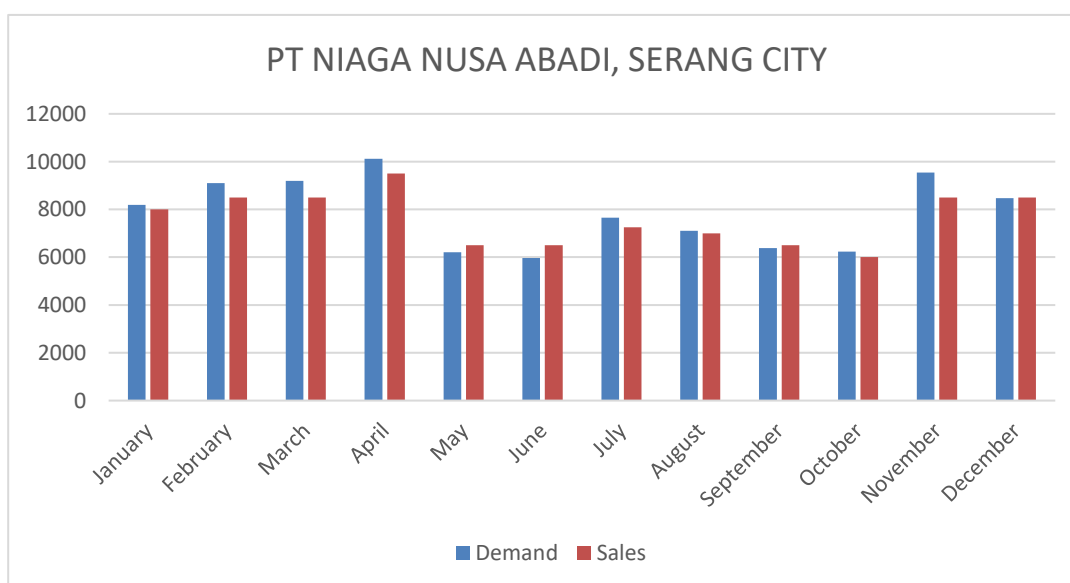
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The development of the business world is currently increasing. The rate of growth is very rapid, this is marked by the development of various specialized businesses in the field of manufacturing. Most of these companies will invite competition. In winning several competitions the company uses various ways to increase customer satisfaction through quality products, on time delivery, and cost efficiency (Kurniawan Kelen & Sikas, 2019). Is the main ingredient to support the sustainability of the production process. Factors that support good planning and regulation so that there are those who can meet production needs at low cost (Nunung Indra Lesmana 2016). In Indonesia, the manufacturing industry is very diverse, one of which is the manufacturing industry in the cigarette field. Where cigarettes have a relatively high position in the space of Indonesia's economic allocation. The cigarette industry is part of a sector that has high domestic competitiveness, so that it is able to contribute to the national economy (Ikhsan, Kurnianto, Apriyanto, Nurdin, & Puji, 2019). In the business world, transportation and distribution are two components that increase company excellence because the reduction in transportation costs can increase company profits (Yuniarti & Astuti, 2013).

Distribution is the process of distributing goods from producers to consumers which is an important factor for companies to be able to deliver products precisely to consumers. Inventory placement at each location needs to be considered and handled properly so that the inventory can be optimal, ie not doing too much storage (Wahyuniardi, Syarwani, & Anggani, 2017). Distributors are required to distribute products quickly and precisely to prevent the vacancy of existing stock in consumers or customers. Consumers will feel satisfied with the distributor's service, if the product arrives on time, on the right quantity, and on the right quality (Harsono & Putro, 2017). Fulfillment of requests that are not fulfilled on time can result in transportation (truck) to wait quite a long time, because the desired finished product is not available on the production floor. Products that are not available in warehouses are caused by poor production scheduling that does not have a good forecast basis and there are variations in product shipments, resulting in non-smooth distribution of products (Mak Wai Kin et al., 2015). The phenomenon in this study is the distribution of activities at PT Niaga Nusa Abadi, Serang City. With fluctuating demand for goods, the flow of goods has fluctuated between demand for goods and delivery of goods that fluctuates but in the monthly period there is often a gap between the amount of goods sent and the demand for goods that can be illustrated in Figure 1).



Source. PT Niaga Nusa Abadi, Serang City 2019.

Based on Figure 1, it can be seen that there is a difference between the number of requests and the number of goods delivered by PT Niaga Nusa Abadi, Serang City, as in January there were 192 bales, February 602 bales, March experienced a shortage of 692 bales, month April experienced a shortage of 616 bales, in May it was over 292 bales, in June it was over 534 bales, in July it was down by 400 bales, in August it was down by 106 bales, in September had an excess of 114 bales, in October had a shortage of 236 bales, November experienced a shortage of 1046 bales, and December had an excess of 30 bales.

Things that can be done by PT Niaga Nusa Abadi is planning and scheduling replenishment of inventory for distribution needs. According to (Sutoni & Agustian (Universitas Suryakencana), 2017) there are several

models of inventory replenishment systems in distribution, namely Re-Order Points (periodic reorder point systems), Periodic Review Systems, multiple point ordering systems, The Sales Replacement System (replacement system sales), and Distribution Requirement Planning (distribution activity scheduling system). With these problems, distribution planning and scheduling is carried out using the Distribution Requirement Planning (DRP) method. It is expected that with good planning and scheduling of distribution activities, success in fulfilling requests will be more optimal (Kurniawan Kelen & Sikas, 2019).

## LITERATURE STUDY

### Distribution

Distribution is one aspect of marketing. Distribution can also be interpreted as marketing activities that seek to facilitate and facilitate the delivery of goods and services from producers to consumers, so that their use is appropriate to what is needed (type, amount, price, place, and when needed). A distributor or company is an intermediary that distributes products from the manufacturer (manufacturer) to retailers (retailers). After a product is produced by the factory, the product is sent (and usually sold at once) to a distributor. The distributor then sells the product to the retailer or customer. (<http://id.wikipedia.org/wiki/Distribution.bisnis>). Physical distribution flexibility is the company's ability to quickly and effectively adjust inventory, packaging, warehousing and physical transportation of products to respond to customer needs (Harsono & Putro, 2017). According to (Wahyuni et al, 2017: 24) distribution is the process of delivering goods from producers to consumers. Distribution is also an activity of moving goods and services from the source to the customer or end consumer through timely distribution channels (Sutoni & Agustian, 2018: 122). Distribution in the logistics world has become an important and very important part, where distribution is the process of moving goods from suppliers to the last customers involved in the supply chain, because it can affect supply chain costs (Harsono & Putro, 2017). The main objective of distribution strategy is placing the product as close as possible to the consumer, so the product can be grabbed by users. Thus every time a consumer needs an item, they can buy it easily.

### Distribution Requirement Planning

Distribution Requirement Planning (DRP) is an application of numbers using Time Phased On Point (TPOP) logic which functions to determine the needs to replenish inventory in a branch warehouse (Sutoni & Agustian (Universitas Suryakencana), 2017). According to (Sutoni & Agustian (Universitas Suryakencana), 2017) Distribution Requirement Planning (DRP) is a method used to determine when to refill inventory based on the demand phase for each item in a distribution channel. DRP is based on forecasting needs at the lowest level in the network (DC or Depo) which will determine the inventory needs at a higher level (factory). Distribution Requirement Planning (DRP) is a method for handling inventory procurement in a multi-echelon distribution network. This method is in accordance with planning on each level in the distribution network (Kurniawan Kelen & Sikas, 2019).

Inputs in the Calculation of Distribution Requirement Planning Some of the inputs required in the calculation of Distribution Requirement Planning (DRP) include:

1. Bill of Distribution (BOD), which is information that can describe levels in a distribution system.
2. Lead Time Data or time data needed from the beginning of the order process to the process of goods being received by the customer.
3. Historical demand data, i.e. recording past requests.
4. Forecasting or forecasting requests.
5. The size of the lot size or size of the order that can be ordered by the customer
6. Fleet capacity which is the limit in the process of delivering products.
7. Safety stock or safety stock.

### Components of Distribution Requirement Planning

(Mak Wai Kin et al., 2015) states that the following are the components in making scheduling using DRP:

1. Lot Size, is a size commonly used in one transfer, which is in accordance with the transfer capacity. Lot size states the determination of the lot when ordering goods.
2. Lead Time, states the time required to send a number of goods with a certain lot.
3. Safety stock, states that inventory reserves must exist in anticipation of needs.
4. Gross Demand, is the result of forecasting consumer demand that has been made at a certain time. Gross demand usually shows the market demand that must be met by the company at a certain time.
5. Net Requirements, states the net amount of goods needed to meet deficiencies in existing requests and adjusted Planned Order Release, Safety Stock, and Reorder Points.
6. Planned Order Receipt, states the quantity of orders needed in a period. Planned Order Receipt appears at the same time as Net Requirements, but the size of the order depends on the Order Policy and takes into account the Safety Stock.
7. *Planned Order Release*, states when an order must be made, so that the goods are available when a request occurs. Order time depends on the lead time available

**Forecasting**

Forecasting is an art and science in predicting future events. Forecasting will involve taking historical data (such as last year's sales) and projecting them into the future with mathematical models (Rahman & Sastro, 2019). According to (Gifari & Suliantoro, 2016) forecasting activity is a business function that tries to estimate the sale and use of products so that the products can be made in the right quantity.

**Forecasting Types**

(Rahman & Sastro, 2019) has divided several types of forecasting into three main types of forecasting in planning future operational activities, namely: Economic forecasting (Economic Forecasts), forecasting technology (Technological Forecasts), forecasting demand (Demand Forecasts).

**Forecasting Components**

(According to (Rahman & Sastro, 2019) Forecasting has four important components, namely: trends, is the movement of data little by little. Season, is a pattern of data that repeats over a certain period of time, such as day, week, month or quarter. Cycles, are patterns in data that occur every few years. Variation, random is a special point in the data caused by opportunities and unusual situations. Random variations do not have a specific pattern, so they cannot be predicted.

**Time Horizon Forecasting**

Rahman & Sastro 2019 classifies forecasting with the time horizon that surrounds it. The time horizon is divided into three categories as follows: short-term forecasting: this forecast has a vulnerable time of 3 Months - 1 Year. Used for planning planning, job scheduling and job assignments, Medium-term forecasting: forecasting generally spans more than 3 months - less than 3 years. Useful in the design of sales production planning, long-term forecasting: generally up to more than 3 years, long-term forecasting is used in planning for new products, and research and development

**RESEARCH METHODOLOGY**

This research is an Applied Research, which is a research that aims to solve a problem currently faced by a particular company or management (Harsono & Putro, 2017). By counting:

1. Calculate OQ (Order Quantity) OQ (Order Quantity) is calculated using the Cargowizz Software, a cargo transportation planning software based on the volume of goods to be loaded.
2. Calculating Safety Stock for each Sub Depo In order to keep the stock status (Stock level) safe, a safety inventory must be made for each distribution center (DC) according to the variance of average demand for Lead Time with rumors:

$$SS = Z\alpha \cdot \sigma \cdot \sqrt{L}$$

Where:

- Z $\alpha$  : Service Level Company
- $\sigma$  : Standar Deviasi
- L : Lead Time

3. Create a Distribution Requirement Planning (DRP) worksheet. After the optimal order quantity is determined monthly product order planning using the DRP method. The steps in calculating DRP can be determined using the following formula:
  - a. Requirement demand. Taken based on historical and forecasting.
  - b. Net requirements are calculated from:

$$NR = (GR + SS) - (SR + POH_{n-1})$$

- The net requirement value recorded is positive.
- c. Planned order receipt is a plan for receiving a product for the order quantity set at the same time as the net requirement occurs.
- d. Planned order release is a plan for releasing orders to a higher level of distribution, obtained from.
- e. Projected on hand is calculated from:

$$POH = (POH_{n-1} + SR + POR_C) - GR$$

4. Calculating costs based on company method.
5. Calculate company costs based on the DRP method.
6. Comparing the distribution costs of the DRP method with those of the company. If the company's distribution costs are <DRP distribution costs, the proposal is REJECTED. If the company distribution cost> DRP distribution fee, the proposal is ACCEPTED.
7. If the proposal is accepted, the 2020 period is calculated using the Distribution Requirement Planning (DRP) method.
8. Determine the demand for requests for each sub-depot. At this initial stage, data requests for each sub-depot are predicted using the help of the POM software for Windows. Then calculated one by one and then selected which has the smallest mean square of error (MSE) which will be chosen as a method for forecasting in the period 2020.
9. Calculating the safety stock (SS) peride 2020 based on the results of forecasting.
10. Calculates the 2020 DRP based on existing forecasting.
11. Conclusions, the last step taken is drawing conclusions from all stages that have been passed. The conclusion must be able to reveal the main things obtained from the essence of the study.

## RESULT AND DISCUSSION

### Data collection

Data collected by requesting historical company records and direct observations in the field, include:

1. Product Demand Data
2. Data Inventory on Hand
3. Data on angkut fleet capacity and volume of goods
4. Lead Time
5. Shipping Costs
6. Product Prices
7. Storage Cost

These data are data that are needed by researchers in processing data to determine the efficiency of product distribution and compare which is better between the Company methods or using the Distribution requirements Planning method.

### Data on Product Demand in 2019

Inventory on Hand

City	Type of Products			
	Class Mild	Matra	Aroma	Minak Djinggo
Cilegon	350	225	50	30
Pandeglang	300	200	100	75
Labuan	250	175	75	50

Source: PT Niaga Nusa Abadi, Serang City (data is processed)

**Table 1.**  
Inventory on Hand

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The amount of inventory available at each Distribution Center is not the same, depending on the magnitude of fluctuations that occur at the Distribution Center. The initial inventory level is determined based on the end of the previous period.

Lead Time

Type of Products	Lead Time (Day)
Class Mild	2
Matra	2
Aroma	2
Minak Djinggo	2

**Table 2.**  
Load Time

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**AMBR**

Lead Time is the waiting time needed from the time the product is ordered until the product arrives at the location, the Lead Time needed in this study is 2 days.

**Shipping costs.**

**Table 3.**  
*Shipping Cost*

Cost Deatils	Cilegon	Pandeglang	Labuan
Installation Fee (Telephone)	Rp 10.000	Rp 10.000	Rp 10.000
Order File and Delivery Note	Rp 12.500	Rp 12.500	Rp 12.500
Labor Costs Involved (Driver and Sales)	Rp 250.000	Rp 250.000	Rp 250.000
Cost of Supervisor / Inspection	Rp 25.000	Rp 25.000	Rp 25.000
Road Fees (Gasoline & Toll)	Rp 500.000	Rp 750.000	Rp 1.000.000
<b>Total Shipping Costs</b>	<b>Rp 797.500</b>	<b>Rp 1.047.500</b>	<b>Rp 1.297.500</b>

Source: PT Niaga Nusa Abadi, Serang City (data is processed)

Shipping costs represent the amount of costs that must be incurred by the company to make deliveries to each location of the distribution center of each region. Total shipping costs using the Company Method in 2019.

Storage Cost Product in 2019

$$\begin{aligned}
 \text{Storage Costs} &= \text{Storage Costs} + \text{Total Shipping cost Product} \\
 &= (\text{Rp. } 25.000.000 \times 12) + (\text{Rp. } 75.420.000 + \\
 &\quad \text{Rp. } 75.420.000 + \text{Rp. } 75.420.000 + \text{Rp. } 37.710.000) \\
 &= \text{Rp. } 300.000.000 + \text{Rp. } 263.970.000 \\
 &= \text{Rp. } 563.970.000
 \end{aligned}$$

By using the Company Method used by the Company, a Grand Total Cost distribution of Rp. 563,970,000, - for the period 2019.

**Safety Stock in 2019**

**Table 4.**  
*Safety Stock (Bal)*

Type of Products	City	Safety Stock
<b>Class Mild</b>	Cilegon	71
	Pandeglang	53
	Labuan	43
<b>Matra</b>	Cilegon	70
	Pandeglang	76
	Labuan	53
<b>Aroma</b>	Cilegon	45
	Pandeglang	40
	Labuan	32
<b>Minak Djinggo</b>	Cilegon	30
	Pandeglang	27
	Labuan	22

Source: PT Niaga Nusa Abadi data processing results (with Safety Stock formula)

Safety Stock is a safety stock prepared by each Distribution Center that intends to maintain stock of goods in the event of a problem both in shipping and in the production activities of the goods.

**Order Quantity**

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Type of Products	Order Quantity
Class Mild	883 bal
Matra	1034 bal
Aroma	409 bal
Minak Djinggo	511 bal

Source: PT Niaga Nusa Abadi data processing results (with Cargowizz)

Order Quantity is the optimum amount of product load in one shipment which is calculated using the Cargowizz tool.

**Calculations using the 2019 DRP Method**

SS = 71		OQ = 883		CLASS MILD CILEGON																							
Activity	Past Due	Period (Week)																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
GR		1066	630	520	760	600	898	1256	744	860	564	1026	512	534	476	432	598	552	528	530	538	760	898	712	650		
SR																											
PoH	350	167	420	783	23	306	291	-82	57	80	399	256	627	93	500	68	346	677	149	502	847	87	72	243	1126		
NR		787	534	171	48	648	663	1036	897	874	555	698	327		454	3	601	277		452	107		882	711	478		
PoRc		883	883	883		883	883	883	883	883	883	883	883		883	883	883	883		883		883	883	883	883		
PoRs	883	883	883		883	883	883	883	883	883	883	883		883	883	883	883		883		883	883	883	883			

Storage Costs = Rp. 25.000.000,- x 1 Tahun = Rp. 25.000.000,-  
 Shipping Costs = 20 x Rp 797.500,- = Rp. 15.950.000,-  
 Total cost = Rp. 25.000.000,- + Rp. 15.950.000 = Rp. 40.950.000,-

**Grand Total Cost using the Method Distribution Requirement Planning 2019**

Type of Products	City	Total Cost
Class Mild	Cilegon	Rp. 40.950.000
	Pandeglang	Rp. 37.750.000
	Labuan	Rp. 40.570.000
Matra	Cilegon	Rp. 36.165.000
	Pandeglang	Rp. 38.617.500
	Labuan	Rp. 39.272.500
Aroma	Cilegon	Rp. 32.975.000
	Pandeglang	Rp. 38.617.500
	Labuan	Rp. 39.272.500
Minak Djinggo	Cilegon	Rp. 28.190.000
	Pandeglang	Rp. 30.237.500
	Labuan	Rp. 28.892.500
<b>Total</b>		<b>Rp. 431.510.000</b>

**Table 6.**  
*Grand Total Cost  
DRP 2019*

After calculating the distribution costs during 2019 using the Company method and the DRP method, it turns out the total cost if using the company method, which is Rp. 563,970,000, - greater than the DRP method, namely: Rp. 431,510,000, - with the difference, as follows

$$\text{Rp. } 563.970.000 - \text{Rp. } 431.510.000 = \text{Rp. } 132.460.000,-$$



**AMBR**

With presentase:

$$\frac{Rp. 132.460.000}{Rp. 563.970.000} \times 100 = 23,49\%$$

The difference obtained by comparing the company's method with the DRP method is the difference of 23.49%, so that the DRP method can be chosen to plan and schedule product distribution for the cities of Cilegon, Pandeglang and Labuan for the following periods, the DRP method is considered more efficient than the method Company.

**Request Forecasting****Requeste Forecasting PT Niaga Nusa Abadi, Serang City 2020**

The calculation is done in units (Bal)

**Table 7.**  
Request  
Forecasting  
*Class Mild Year*  
2020

PRODUCT	MONTH	CILEGON	PANDEGLANG	LABUAN
C	January	746	470	517
	February	491	392	249
L	March	530	419	340
A	April	584	405	510
S	May	593	431	429
S	June	510	544	406
M	July	699	467	335
	August	444	388	497
I	September	483	415	229
L	October	537	402	369
D	November	546	428	490
	Desember	463	541	409

Source: Operation Forecast from Pom For Windows

**Table 8.**  
Request  
Forecasting  
*Aroma Year 2020*

PRODUCT	MONTH	CILEGON	PANDEGLANG	LABUAN
M	January	547	569	496
	February	692	494	364
A	March	481	516	451
T	April	669	487	493
R	May	553	418	361
	June	698	403	447
A	July	488	540	490
A	August	676	466	357
	September	560	488	444
A	October	705	458	487
	November	494	390	354
	Desember	683	374	441

Source: Operation Forecast from Pom For Windows



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PRODUCT	MONTH	CILEGON	PANDEGLANG	LABUAN
A R O M A	January	183	239	127
	February	94	258	162
	March	179	216	72
	April	182	247	162
	May	93	247	162
	June	178	266	149
	July	180	225	59
	August	91	255	149
	September	176	256	101
	October	178	274	137
	November	89	233	47
	Desember	174	263	136

**Table 9.**  
Request Forecasting  
Aroma Tahun 2020

Source: Operation Forecast from Pom For Windows

PRODUCT	MONTH	CILEGON	PANDEGLANG	LABUAN
M I N K  D J I N G G O	January	176	84	110
	February	199	196	64
	March	184	195	97
	April	207	200	51
	May	192	198	85
	June	214	203	38
	July	199	202	72
	August	222	206	26
	September	207	205	59
	October	230	209	13
	November	215	208	47
	Desember	238	213	18

**Table 10.**  
Request Forecasting  
Minak Djinggo  
Tahun 2020

Source: Operation Forecast from Pom For Windows

Forecasting is done with the POM for Windows tool by calculating Trend Analysis, Linear Regretion, Multiplicative Decomposition and Additvie Decomposition. Then look for the smallest MSE value which later will be used as the basis for forecasting.

**Total shipping costs using the Company Method in 2020**

**Distribution Cost Product in 2020**

$$\begin{aligned}
 \text{Distribution Cost} &= \text{Storage costs} + \text{total shipping costs product} \\
 &= (\text{Rp. } 25.000.000 \times 12) + (\text{Rp. } 37.710.000 + \\
 &= \text{Rp. } 37.710.000 + \text{Rp. } 37.710.000 + \text{Rp. } 37.710.000) \\
 &= \text{Rp. } 300.000.000 + 150.840.000 \\
 &= \text{Rp. } 450.840.000,-
 \end{aligned}$$

By using the methods used by the company. The grand total cost of distribution is Rp. 450,840,000 for distribution in 2020.

**Safety Stock in 2020**

**Table 11.**  
Safety Stock 2020

Product	City	Safety Stock
<b>Class Mild</b>	Cilegon	31
	Pandeglang	18
	Labuan	33
<b>Matra</b>	Cilegon	31
	Pandeglang	21
	Labuan	20
<b>Aroma</b>	Cilegon	15
	Pandeglang	6
	Labuan	14
<b>Minak Djinggo</b>	Cilegon	7
	Pandeglang	12
	Labuan	11

Source: PT Niaga Nusa Abadi data processing results (with Safety Stock formula)

**Calculation method DRP tahun 2020**

Activity	SS =	CLASS MILD CILEGON											
	Past Due	Period (Week)											
		1	2	3	4	5	6	7	8	9	10	11	12
GR		746	491	530	584	593	510	699	444	483	537	546	463
SR													
PoH	350	487	879	349	648	55	428	612	168	568	31	368	788
NR		427	35		266		486	302		346		546	126
PoRc		883	883		883		883	883		883		883	883
PoRs	883	883		883		883	883		883		883	883	

Stroge Costs = Rp. 25.000.000,- x 1 Tahun = Rp. 25.000.000,-  
 Shipping Cost = 8 x Rp 797.500,- = Rp. Rp. 6.380.000,-  
 Total Costs = Rp. 25.000.000,- + Rp. 6.380.000 = Rp. 31.380.000,-

**Grand Total Cost uses the Distribution Requirement Planning Method in 2020**

**Table 12.**  
Grand Total Cost  
DRP 2019

Product	City	Total Cost
<b>Class Mild</b>	Cilegon	Rp. 31.380.000
	Pandeglang	Rp. 31.285.000
	Labuan	Rp. 32.785.000
<b>Matra</b>	Cilegon	Rp. 30.582.500
	Pandeglang	Rp. 31.285.000
	Labuan	Rp. 31.487.500
<b>Aroma</b>	Cilegon	Rp. 28.987.500
	Pandeglang	Rp. 33.380.000
	Labuan	Rp. 30.190.000
<b>Minak Djinggo</b>	Cilegon	Rp. 28.987.500
	Pandeglang	Rp. 30.237.500
	Labuan	Rp. 27.595.000
<b>TOTAL</b>		Rp. 368.182.500

Source: Results of data processing using the DRP Worksheet

### Comparison of Corporate Methods with DRP for 2020

After calculating the distribution costs during 2020 using the company and DRP methods, it turns out that the total cost using the company method is Rp. 450,840,000, - Greater than the DRP method of Rp.

368,182,500, - by the difference:

Rp. 431,985,000 - Rp. 368,182,500 = Rp. 82,657,500

With presentase:

$$\frac{Rp. 82.657.500}{Rp. 450.840.000} \times 100 = \mathbf{18,33\%}$$

For 2020 the difference obtained by comparing the company and DRP methods was 18.33%.

### Comparison of company and DRP methods

Information	Year			
	2019		2020	
Company Method	Rp	563.970.000	Rp	450.840.000
DRP Method	Rp	431.510.000	Rp	368.182.500
Difference	Rp	132.460.000	Rp	82.657.500
Percentage		<b>23,49%</b>		<b>18,33%</b>

Source: Results of Company Method Data & DRP Method

**Table 13.**  
Research Results

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In (Table 17) the total cost to be incurred by the company will be more efficient if using the Distribution Requirement Planning method, the cost efficiency can reach 14.76% - 23.49% of the total cost that must be incurred by the company for each year without considering several other external factors. This efficient total cost can be obtained because the DRP method will optimize every product shipment made to the regional distribution center, so that each order of the product and its delivery will be as needed

## CONCLUSION

### 1. Distribution of Products for 2019

- a. The number of items that must be available to prevent the occurrence of Indent conditions at each distribution center for Class Mild cigarettes is Cilegon 71 bales, Pandeglang 53 bales, and Labuan 43 bales. Matra types of cigarettes are Cilegon 76 bales, Pandeglang 70 bales, and Labuan 53 bales. Aroma types of cigarettes are Cilegon 45 bales, Pandeglang 40 bales, and Labuan 32 bales. And for Djinggo Minak cigarettes are Cilegon 30 bales, Pandeglang 27 bales, and Labuan 22 bal.
- b. Effective delivery based on the DRP method for the entire Distribution Center for Class Mild, Matra, Aroma and Minak Djinggo products is 128 times.
- c. The number of items sent on a single shipment is based on cargowizz software for Class Mild 883 bales, Matra 1034 bales, Aroma 409 bales, and Djinggo Minak 511 bales.
- d. The results of calculations using the company method with the DRP method. In the distribution period of 2019 it showed that the DRP method of Rp. 431,510,000, - and the company's method of Rp. 563,970,000, - so the company is able to save costs by Rp. 132,460,000, or 23.49% more efficient.

### 2. Distribution of Products for 2020

- a. The need for goods in the 2020 period can be seen in the results of forecasting that can be seen in (table 11 - table 14) which have been calculated using the POM for Windows Software.
- b. The number of items that must be available to prevent the occurrence of Indent conditions at each distribution center for Class Mild cigarettes is Cilegon 31 bales, Pandeglang 18 bales, and Labuan 33 bales. Matra types of cigarettes are Cilegon 31 bales, Pandeglang 21 bales, and Labuan 20 bales. Aroma types of cigarettes are Cilegon 15 bales, Pandeglang 6 bales, and Labuan 14 bales. And for Djinggo Minak cigarettes are Cilegon 7 bales, Pandeglang 12 bales, and Labuan 11 bales.
- c. Effective deliveries based on the DRP method for the entire Distribution Center for Class Mild, Matra, Aroma and Minak Djinggo products are 62 times.
- d. The number of items sent on a single shipment is based on cargowizz software for Class Mild 883 bales, Matra 1034 bales, Aroma 409 bales, and Djinggo Minak 511 bales.
- e. The results of calculations using the company method with the DRP method. The distribution period in 2020 shows that the DRP method of Rp. 368,182,500 and company method of Rp. Rp. 450,840,000, - so the company is able to save costs by Rp. 82,657,500, - or the company is able to be more efficient 18.33%.

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