Aggregate Planning Method as Production Quantity Planning and Control to Minimizing Cost

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Abstract. Production planning is very important in a production because it is related to the amount of fluctuating consumer demand in each period. If there is a product shortage will cause consumer demand cannot be fulfilled so the company loses profits and commitment from customers who have trusted. However, if the excess production in a certain period there will be a buildup of products that are generated and will result in high storage costs of finished products and waste of product storage. Products that often occur in fluctuating demand is wheat flour products. Based on observations at PT. Bulog, the authors provide an analysis to overcome the problem of fluctuating demand at PT. Bulog with aggregate planning methods. Based on forecasting results that have been obtained in the previous period wheat flour demand data at PT. Bulog, we will determine the quantity and the future production time for wheat flour products. Production planning is a very important activity of all production activities of a company. Based on the calculation of aggregate planning that has been done using the company's demand and production data PT. Bulog in the previous period found that the best method that can be used in the company's production process is the chase strategy method, this method is used by increasing or reducing the number of workers based on the number of consumer demand. By using a chase strategy, the costs used by the company are less when compared to other methods. Costs to be incurred based on the selection of the best method for the product “Tepung Terigu Kita” is IDR 341,857,000.00.

1. Introduction

Industry in the world has grown and developed rapidly. Along with its development, competition between companies will be increasingly fierce, especially in the food industry in Indonesia. With increasing competition, of course the company will further improve the quality of its management in order to survive in the competition. One of them is to improve the continuity of production in order to meet consumer demand in a timely manner, also with minimal production costs [1].

Perum Bulog is a state-owned public corporation in the field of food logistics. Bulog's sales of "KITA" products are related to Bulog's current position which must be able to support itself through commercial business. One of the food products from Bulog's business activities is wheat flour with the trademark “Terigu Keluarga Indonesia” "Terigu Kita” is produced and distributed by Perum BULOG along with companies that work with Perum Bulog.
Along with the increasingly familiar products that have been produced by PT. Bulog and with continued product development, the demand for these products has also increased. The main problem in increasing productivity in anticipation of increasing market demand is the limited production capacity. To anticipate the possibility of inadequate production capacity, planning for capacity needs must be done as well as possible with minimal costs. So there is not enough capacity and the company gets the optimal profit in every production.

Production planning is very important in a production because it is related to the amount of fluctuating consumer demand in each period. If there is a product shortage will cause consumer demand cannot be fulfilled so the company loses profits and commitment from customers who have trusted. However, if the excess production in a certain period there will be a buildup of products that are generated and will result in high storage costs of finished products and waste of product storage.

Products that often occur in fluctuating demand is wheat flour products. Based on observations at PT. Bulog, the authors provide an analysis to overcome the problem of fluctuating demand at PT. Bulog with aggregate planning methods. Based on forecasting results that have been obtained in the previous period wheat flour demand data at PT. Bulog, we will determine the quantity and the future production time for wheat flour products. Production planning is a very important activity of all production activities of a company [2]. Production planning activities begin with forecasting to find out what and how much needs to be produced in the future [3]. Production forecasting aims to estimate demand for the company's goods or services. But almost all companies cannot always adjust their production levels to real changes in demand. Therefore, companies develop rational plans that show how they will respond to the market.

Aggregate planning is the process of planning the quantity and setting the output time for a certain period of time [4] (usually between three months to one year) through adjusting the levels of production, employee, inventory and other controllable variables [5]. Aggregate planning allows companies to arrange the optimal utilization of company resources, in order to achieve effective and efficient capacity that is made based on forecast demand in the future [6]. Effective which means harmony between planning and the results obtained, while efficient means being able to produce a certain output with the available resources to a minimum. Therefore, it is necessary to make a production plan that can accommodate these goals properly.

2. Methodology

Data is collected by survey, observation, interview and documentation techniques to view and use reports in the company. The second method is the study of literature which aims to solve problems that have been formulated based on previous research and other information. Analyzing problems that occur in the company using several methods. The first method is demand forecasting using linear regression method with the smallest tracking signal calculation. The second method consists of three alternative strategies (level, chase and flexible) for aggregate planning. Sales data for the past three years (May 2016 - April 2019) is to determine demand forecasting for the next 5 months period (May 2019 - September 2019). Data is processed using Microsoft Excel software.

![Figure 1. Research Method](image-url)
Some of the data needed to calculate aggregate planning are:
1. Product demand data for 3 years
2. Data on available resources throughout the period of the aggregate production planning
3. Data related company policies, such as: labor regulations
4. Data on various related costs, such as: costs of recruitment and firing cost, overtime and
   unemployment costs, inventory storage costs, subcontracting costs, part-time labor costs, inventory
   costs or re-ordering.

The objectives to be achieved are:
1. Able to plan production, inventory, and resources that are stable against fluctuations in demand.
2. Able to determine a proper production planning strategy and can minimize the total production
   costs.
3. Understanding the aggregate planning process and capacity in an industry.

The steps taken are:
1. Perform calculation of chase strategy, level strategy and flexible strategy.
2. Analyzing the calculation of chase strategy, level strategy and flexible strategy.
3. Take decisions from the best strategy.

3. Literature Review

3.1 Definition Of Aggregate Planning

Aggregate planning also known as aggregate scheduling is an approach usually carried out by
operations managers to determine the quantity and time of production in the medium term (usually
between 3 and 18 months ahead) [5]. Aggregate planning can be used in determining the best way
to meet the predicted demand by adjusting the value of production, labor level, inventory level, overtime
work, subcontracting level, and other variables that can be controlled [7]. Scheduling decisions
regarding the formulation of monthly and quarterly plans that prioritize the problem of matching
productivity with fluctuating demand [8]. Therefore, aggregate planning is included in the medium-
term plan [9].

3.2 Purpose Of The MRP

Basically the purpose of aggregate planning is to try to obtain an optimal solution to costs or benefits
in the planning period [10]. However, there are other strategic issues that may be more important than
low costs. The strategic problems in question include reducing labor level problems, reducing
inventory levels, or meeting higher levels of service [11]. For manufacturing companies, the aggregate
schedule aims to link the company's strategic goals with the production plan, but for service
companies, aggregate scheduling aims to connect targets to the schedule of workers.

3.3 Characteristics Of Aggregate Planning

Aggregate planning means combining appropriate resources into the whole period [12]. With the
prediction of demand, facility capacity, inventory level, labor size, and interconnected inputs, planners
must choose the level of output for a facility for the next 3 to 18 months. In aggregate planning, the
production plan does not describe per product but concerns how many products will be produced
regardless of the type of product.

4. Results & Discussion

4.1 Data of Observation Results

The following information is obtained from the data collection results in the company shown in the
table below:

| Period | Demand | Period | Demand | Period | Demand |
|--------|--------|--------|--------|--------|--------|
| 1      | 8649   | 13     | 7249   | 25     | 5813   |
| 2      | 9727   | 14     | 8348   | 26     | 9023   |
| 3      | 9537   | 15     | 6689   | 27     | 8881   |
| 4      | 9181   | 16     | 8107   | 28     | 6499   |
Period | Demand | Period | Demand | Period | Demand |
|-------|--------|-------|--------|-------|--------|
| 5     | 7209   | 17    | 6238   | 29    | 9431   |
| 6     | 5915   | 18    | 9722   | 30    | 6809   |
| 7     | 7330   | 19    | 8602   | 31    | 9267   |
| 8     | 5259   | 20    | 9208   | 32    | 5824   |
| 9     | 9504   | 21    | 6063   | 33    | 5004   |
| 10    | 9902   | 22    | 8243   | 34    | 6728   |
| 11    | 6230   | 23    | 5869   | 35    | 5006   |
| 12    | 6522   | 24    | 9129   | 36    | 5191   |

Source: Data of PT. Bulog 2019

Table 2. Costs

| Item                          | Unit Cost |
|-------------------------------|-----------|
| Raw Material                  | 6500/unit |
| Holding costs                 | 600/unit/mont |
| Stockout costs                | 1250/unit/mont |
| Hiring and training cost      | 5000/worker |
| Layoff costs (firing)         | 11500/worker |
| Overtime cost                 | 7000/hour/worker |
| Worker costs                  | 5000/hour |

Source: Data of PT. Bulog 2019

Table 3. Other Cost

| Item                          | Unit |
|-------------------------------|------|
| Initial inventory             | 225 unit |
| Productive time / worker / day| 7.5 hour |
| Paid work hours / workers     | 8 worker |
| The number of workers         | 40 worker |
| Production time               | 0.75 hour/unit |

Source: Data of PT. Bulog 2019

4.2 Results Of Strategy

Table 4. Forecasting Results

| Demand (unit) | May   | June  | July  | August | September | Average |
|---------------|-------|-------|-------|--------|-----------|---------|
|               | 6605  | 6554  | 6503  | 6453   | 6401      | 6504    |

Source: Data Processed

Table 4 shows that demand information for each period from May to September 2019 is 6504 units. Data obtained from forecasting using the Centered Moving Average method performed in the previous calculation.

Table 5. Calculation of Data Production Need in 2019

|                         | May   | June  | July  | August | September |
|-------------------------|-------|-------|-------|--------|-----------|
| Number of days          | 25    | 24    | 24    | 25     | 26        |
| Hour / worker / month   | 187.5 | 180   | 180   | 187.5  | 195       |
| Unit/ worker            | 250   | 240   | 240   | 250    | 260       |
| IDR / worker / month    | 1,000,000 | 960,000 | 960,000 | 1,000,000 | 1,040,000 |
| Maximum Production      | 10000 | 9600  | 9600  | 10000  | 10400     |

Source: Data Processed

4.3 Calculation with Level Strategy

In this strategy, companies have limited production capacity and a fixed number of workers. The amount of production is fixed and the inventory that arises can be used to meet the excess demand for the product for a certain period. The calculation formula for the strategy level is shown below [18]:

a. Demand was obtained from the forecasting demand in the past.

b. Get the initial inventory from the information. In this strategy, the initial inventory is constant.
c. Net requirement = demand - initial inventory

d. Production = net requirement

e. Worker needs = production / (unit / worker)

f. Workers = workers’ needs

g. Lastest inventory = net requirement – Production

h. Surplus = inventory

i. Shortage = net requirement – production

j. Raw material costs = raw material costs per unit x of production

k. Worker costs = number of workers x costs / workers / month

l. Holding cost = Surplus x storage costs

| Month      | May | June | July | August | September |
|------------|-----|------|------|--------|-----------|
| Number of days | 25  | 24   | 24   | 25     | 26        |
| Hour / worker / month | 187.5 | 180 | 180 | 187.5 | 195 |
| Unit / worker | 250 | 240  | 240  | 250    | 260       |
| IDR / Worker / month | 1000000 | 960000 | 960000 | 1000000 | 1040000 |
| Demand      | 6,605 | 6,554 | 6,503 | 6,453  | 6,401     |
| Initial Inventory | 225 | 124 | 0 | 1 | 52 |
| Net requirement | 6,380 | 6,430 | 6,503 | 6,452 | 6,349 |
| Worker      | 40   | 40   | 40   | 40     | 40        |
| Production  | 6,504 | 6,504 | 6,504 | 6,504  | 6,504     |
| Lastest Inventory | 124 | 0 | 1 | 52 | 155 |
| Surplus     | 124  | 0    | 0    | 0      | 0         |
| Shortage    | 0    | 0    | 0    | 0      | 0         |

Source: Data Processed

| Costs                   | May       | June      | July      | August     | September  | Costs          |
|-------------------------|-----------|-----------|-----------|------------|------------|----------------|
| Workers (IDR)           | IDR40,000,000 | IDR38,400,000 | IDR38,400,000 | IDR40,000,000 | IDR41,600,000 | IDR198,400,000 |
| Raw Material (IDR)      | IDR42,276,000 | IDR42,276,000 | IDR42,276,000 | IDR42,276,000 | IDR42,276,000 | IDR211,380,000 |
| Holding cost (IDR)      | IDR74,400 | IDR0      | IDR0      | IDR31,200  | IDR93,000   | IDR199,200     |
| Stockout cost (IDR)     | IDR0      | IDR12,500 | IDR0      | IDR0       | IDR0        | IDR12,500      |
| Total                   |           |           |           |            |            | IDR409,991,700.00 |

Source: Data Processed

Figure 2. Level Strategy Chart

Table 6 explains the results of calculations with level strategy. From the calculation, it is found that the initial inventory obtains from the previous information which is 225 units, specifically for the beginning of the period in May, while for the following month it is obtained from the difference
between production and net requirements. For net requirement obtained from the amount of demand reduced by initial inventory. Obtained that the net requirement for the May period is 6380 units, June 6430 units, July 6503 units, August 6452 units and September 6349 units. Whereas for production is obtained from multiplication between workers and units per worker, so the results for January to September are equal at 6504 units. For the initial inventory with a surplus amount is the same for each period. At this level, there is no shortage because the amount of net requirement is less than the amount of production, so the company does not lack production. And then, table 7 explains the results of the calculation of production costs level strategy. Figure 2 shows the level strategy graph. The graph includes the number of production and maximum production capacity. Maximum production capacity is always the same as the number of productions in each period. For the amount of production, which is always the same as the maximum production capacity in each period.

### 4.4 Calculation with Chase Strategy

In this strategy the capacity and amount of production have the variety of demand according to each period. The Chase Strategy calculation formula is shown below [18]:

- **a.** Demand was obtained from the forecasting demand in the past
- **b.** The initial inventory of the month is obtained from information. The next one comes from the last inventory in the previous period.
- **c.** Net requirement = demand - initial inventory
- **d.** Production = net requirement
- **e.** Worker needs = production / (unit / worker)
- **f.** Employed = worker needs – available workers
- **g.** Fired = available workers - conditional workers
- **h.** Workers = workers' needs
- **i.** Last inventory = net requirement - production
- **j.** Raw material costs = raw material costs per unit x production
- **k.** Worker costs = number of workers x costs / workers / month
- **l.** Costs are employed = costs of being fired / workers x number of reinstating workers
- **m.** Costs fired = costs of being fired / workers x number of workers fired

**TABLE 8. Chase Strategy Calculation**

| Month       | May | June | July | August | September |
|-------------|-----|------|------|--------|-----------|
| Number of days | 25  | 24   | 24   | 25     | 26        |
| Hour / worker / month | 187.5 | 180  | 180  | 187.5  | 195       |
| Unit / worker    | 250 | 240  | 240  | 250    | 260       |
| IDR / Worker / month | 1000000 | 960000 | 960000 | 1000000  | 1040000   |
| Demand          | 6,605 | 6,554 | 6,503 | 6,453  | 6,401     |
| Initial Inventory | 225  | 0    | 0    | 0      | 0         |
| Net requirement  | 6,380 | 6,554 | 6,503 | 6,453  | 6,401     |
| Worker needs    | 26   | 28   | 26   | 25     | 25        |
| Hired           | 0    | 2    | 0    | 0      | 0         |
| Fired           | 14   | 0    | 2    | 1      | 0         |
| Workers         | 26   | 28   | 28   | 26     | 25        |
| Last inventory  | 0    | 0    | 0    | 0      | 0         |

Source: Data Processed

**TABLE 9. Calculation of Production Costs**

| Cost          | May       | June      | July      | August     | September  | Costs       |
|---------------|-----------|-----------|-----------|------------|------------|-------------|
| Raw Material  | IDR 41,470,000.00 | IDR 42,601,000.00 | IDR 42,269,500.00 | IDR 41,944,500.00 | IDR 41,606,500.00 | IDR 209,891,500.00 |
| Worker (IDR)  | IDR 26,800,000.00 | IDR 26,880,000.00 | IDR 26,800,000.00 | IDR 26,000,000.00 | IDR 131,760,000.00 |
| Hiring cost (IDR) | IDR 0.00 | IDR 10,000.00 | IDR 0.00 | IDR 0.00 | IDR 0.00 | IDR 10,000.00 |
| Firing cost (IDR) | IDR 0.00 | IDR 0.00 | IDR 0.00 | IDR 23,000.00 | IDR 11,500.00 | IDR 195,500.00 |
| Total         | IDR 0.00 | IDR 0.00 | IDR 0.00 | IDR 0.00 | IDR 0.00 | IDR 341,857,000.00 |

Source: Data Processed
Table 8 explains the results of calculations with chase strategy. From the calculation, it is found that the initial inventory is obtained from previous information, namely 225 units since the beginning of the period in May, while for other periods are zero because there is no inventory. The net requirement is obtained from the total demand reduced by the initial inventory so that it is obtained that the net need for May 6380 units, June 6554 units, July 6503 units, August 6453 units and September 6401 units. The amount of production is also equal to the net requirement. Workers need for the period from May to September are between 25 and 28 workers. Due to the initial number of workers of 40 people, while only requiring 26 people, there were 14 workers who were fired in the May period, so for the next period the number of workers has been adjusted to the number of workers’ needs. Because the amount of net requirement is equal to the amount of production, there is no inventory in all periods. And then, Table 9 explains the results of the calculation of production costs chase strategy. Figure 3 shows the chase strategy graph. The graph includes the number of production and maximum production capacity. Maximum production capacity is always higher than the amount of production in each period.

4.5 Calculation with Flexible Strategy
This strategy is a combination of level strategy and chase strategy. For example, a company has sufficient production capacity, then the utility of production facilities is used as a reference in determining aggregate planning. In this case the number of workers is permanent, but the working hours of each worker have variability adjusted to the level of product demand. The flexible strategy calculation formula is shown below [18]:

- a. Demand was obtained from the forecasting demand in the past
- b. The initial inventory of the month is obtained from information. The next one comes from the last inventory in the previous period.
- c. Net requirement = demand - initial inventory
- d. In flexible strategy, Net requirement only available in the first period.
- e. Production = worker x unit / worker
- f. Worker Needs = from the initial number of workers (constant number for each period)
- g. Lack of production = net requirement - production
- h. Surplus = production - net requirement
- i. Overtime Production = shortage
j. Overtime / work hours = (overtime production x production time) / number of days / number of workers

k. Raw material costs = raw material costs per unit x production

l. Worker costs = number of workers x costs / workers / month

m. Holding cost = Surplus x storage costs

n. Along with the cost of time = the number of overtime hours x the cost of overtime number x workers.

| TABLE 10. Workforce and Overtime Strategy |
|------------------------------------------|
| Month | May | June | July | August | September |
| Number of days | 25  | 24  | 24  | 25  | 26  |
| Hour / worker / month | 187.5 | 180 | 180 | 187.5 | 195 |
| Unit / worker | 250 | 240 | 240 | 250 | 260 |
| IDR / Worker / month | 1000000 | 960000 | 960000 | 1000000 | 1040000 |
| Demand | 6,605 | 6,554 | 6,503 | 6,453 | 6,401 |
| Initial Inventory | 225 | 0 | 0 | 0 | 0 |
| Net requirement | 6,380 | 6,554 | 6,503 | 6,453 | 6,401 |
| Worker | 40 | 40 | 40 | 40 | 40 |
| Production | 10,000 | 9,600 | 9,600 | 10,000 | 10,400 |
| Shortage of production | 0 | 0 | 0 | 0 | 0 |
| Surplus | 3,395 | 3046 | 3097 | 3547 | 3,999 |
| Overtime Production | 0 | 0 | 0 | 0 | 0 |
| Overtime / worker hours | 0 | 0 | 0 | 0 | 0 |

Source: Data Processed

| TABLE 11. Calculation of Production Costs |
|------------------------------------------|
| Cost | May  | June  | July  | August | September | Costs |
| Workers (IDR) | IDR 40,000,000.00 | IDR 38,400,000.00 | IDR 38,400,000.00 | IDR 40,000,000.00 | IDR 41,600,000.00 | IDR 198,400,000.00 |
| Raw material (IDR) | IDR 65,000,000.00 | IDR 62,400,000.00 | IDR 62,400,000.00 | IDR 65,000,000.00 | IDR 67,600,000.00 | IDR 322,400,000.00 |
| Holding cost (IDR) | IDR 2,037,000.00 | IDR 1,827,600.00 | IDR 1,827,600.00 | IDR 2,128,200.00 | IDR 2,399,400.00 | IDR 10,250,400.00 |
| Biaya Lembur (IDR) | IDR 0.00 | IDR 0.00 | 1,858,200.00 | IDR 0.00 | IDR 0.00 | IDR 0.00 |
| Total | IDR 0.00 | IDR 0.00 | IDR 0.00 | IDR 0.00 | IDR 0.00 | IDR 531,050,400.00 |

Source: Data Processed

Figure 4. Flexible Strategy Chart

Table 10 explains the results of calculations with flexible strategy. From the calculation, it is found that the initial inventory is obtained from previous information, namely 225 units since the beginning of the period in May, while for other periods are zero because there is no inventory. The net requirement is obtained from the total demand reduced by the initial inventory so that it is obtained that the net requirement for May 6380. The amount of production for the flexible strategy is not the same as the net requirement. Workers’ needs for the period from May to September are the same,
namely 40 workers. The amount of production obtained from multiplying the number of workers by units per worker. The result is 10000 units in May; 9600 units in June and July; 10000 units in August; and 10400 units in September. For production shortages do not occur in each period because the number of net requirement is less than the amount of production. Because of this the company had a surplus of 3,395 units in May; 3046 units in June; 3097 units in July; 3547 units in August, and 3999 units in September. There is no shortage production so there is no overtime production from May to September, so there are no overtime hours per day. And then, Table 11 explains the results of the calculation of production costs with flexible strategy. Figure 4 shows the flexible strategy graph. The graph includes the number of production and maximum production capacity.

4.6 Comparison of Three Strategies

After calculating costs based on three strategies, we have a recapitulation and comparison of three strategies. The recapitulation cost will be displayed in the following table 12:

| Strategy       | Regular production | Overtime production | Sub-contracted | Shortage | Inventory | Cost       |
|----------------|---------------------|---------------------|---------------|----------|-----------|------------|
| Level Strategy | √                   | -                   | √             | -        | √         | IDR 409,991,700.00 |
| Chase Strategy | √                   | -                   | -             | √        | -         | IDR 341,857,000.00 |
| Flexible Strategy | √               | -                   | √             | -        | √         | IDR 531,050,400.00 |

Source: Data Processed

Table 12 shows the cost comparison of the three strategy costs. First, the level strategy, the number of workers is fixed at 40 people. By maintaining the amount of workers, a relatively constant level of production will be obtained. If there is a surplus of production, then the surplus is used to cover the production shortage in another month. The level strategy is handling the inventory to meet the demand in the next month. Level strategy plans in which the aggregate production level remains the same for a period of time (constant output). Scheduling levels maintain output levels, production levels, or constant employment levels in the planning horizon. The total cost for level strategy is IDR 409,991,700.00.

Second, chase strategy is a variation in the level of workers, the amount of workers used follows the level of demand for production. Where, sometimes in each month there is a reduction or increase in the number of workers. Chase strategy manufacture products according to the demand at that time so it does not use any inventory handling. Chase strategy aligns production to meet the demand with minimum inventory level. So that the total cost for a variety of workers is IDR 341,857,000.00.

Finally, flexible strategy. This strategy has a fixed workers, but the production level uses the lowest demand forecast every month. When demand increases, the company makes overtime production. The addition of working hours is limited to 4 to 5 hours per day. Thus, it has the largest total production costs among other strategies. In this strategy, there is no shortage of supply so that demand can be met in the planning period and there is a handling charge of inventory. The total production cost of the flexible strategy is IDR 531,050,400.00.

From this table, it can be seen that the lowest cost is the second strategy, the chase strategy. With the most economical cost because in this strategy the company produces only in the first period. The capacity and amount of production determined has variability that matches the variability of the number of product demands in each period. This strategy is used to minimize and stabilize inventory levels [19]. This method is also used by increasing or reducing the number of workers based on the number of consumer demand [20] [21]. To produce an appropriate and efficient strategy, the company must consider the condition of the company such as the company’s production capacity. To implement chase strategy, companies must carefully estimate the workdays of the following year, and determine the worker to be employed, both trained and skilled, with untrained or unskilled workers to optimize the costs of hired or fired workers.

4.7 Approach to Strategy Implementation
If product demand variability during the planning period, there are two alternative approaches, namely:

a. Managing Demand [22, 23]
This approach is done to regulate the level of demand, that is if the demand is smaller than capacity or otherwise. This approach can be done by regulating several factors, namely: price strategy, promotion, reservation and backlog.

b. Adjust capacity [22, 23]
Balancing the required resources is done by changing several factors that affect production capacity, namely: Appointment and dismissal of workers, overtime (overtime work), part time labor, inventory, subcontracting, and setting the engine capacity level.

This approach can be chosen based on two strategies, namely:

a. Pure Strategy [24, 25]
Pure strategy is a strategy by making changes to one of several factors that affect production capacity and performance, such as: appointment and dismissal of workers, subcontracting, and reservation.

b. Mixed Strategy [24, 25]
This strategy is a combination of two or more factors used in a pure strategy by considering company policies and costs incurred.

5. Conclusions
Based on the calculation of aggregate planning that has been done using the company's demand and production data PT. Bulog in the previous period found that the best method that can be used in the company's production process is the chase strategy method, this method is used by increasing or reducing the number of workers based on the number of consumer demand. By using a chase strategy, the costs used by the company are less when compared to other methods. Costs to be incurred based on the selection of the best method for the product “Tepung Terigu Kita” is IDR 341,857,000.00.

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