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Determination of Building Assets and Equipment Requirements Based on Sustainable Warehouse Cencepts for PT Kansai Prakarsa Coatings

Putri Dewi Purnama[1,a)] **& Halla Nur Azizah**[2,b)]

[1)]*Asset Management Study Program, Business Administration Major, Politeknik Negeri Bandung*
[2)]*Asset Management Study Program, Business Administration Major, Politeknik Negeri Bandung*

Correspondent : [a)]putri.dewi@polban.ac.id & [b)]halla.nur.mas19@polban.ac.id

ABSTRACT

Warehouses play a crucial role in supporting the performance of companies in the logistics sector. PT Kansai Prakarsa Coatings (KPC) is a subsidiary of Kansai Paint Co., Ltd., a company in the paint industry sector. The distribution office and warehouse of the Bandung branch of PT Kansai Prakarsa Coatings (KPC) are located at Amir Machmud Street, Number 361, Cigugur Tengah Village, Cimahi Tengah, District, Cimahi City. The total area of the warehouse building is 408 m², with a total capacity of 80 tons. Several key issues have been identified, including poor ventilation and lighting in the closed warehouse, non-compliant loading conditions that do not meet applicable standards, and cases of overloading despite potential development. Since paint is a flammable product, it is necessary to have safe storage facilities. Additionally, paint has a strong odor and contains chemicals, making it essential to store it in a room with good ventilation and air circulation. Based on these main issues, it is important to conduct research to determine the need for building assets and warehouse equipment for PT Kansai Prakarsa Coatings, following the principles of a sustainable warehouse. The ; study is guided by SNI 7331:2007 and incorporates the concept of a sustainable warehouse. Descriptive methods with both qualitative and quantitative approaches were used in this study. Data collection techniques included interviews, observations, and documentation studies. The results of the study indicate that the total additional area required for the warehouse building is 372 m². This calculation is based on the estimated load of products stored both inside and outside the warehouse. Regarding warehouse equipment, based on the concept of a sustainable warehouse, PT Kansai's warehouse needs to procure ventilation systems, occupational health and safety equipment, lighting systems, as well as shelving and material handling equipment.

Keyword : asset management, asset needs, sustainable warehousing

INTRODUCTION

Warehouses greatly support company performance, especially for companies engaged in logistics (Alhori et al., 2020). PT Kansai Prakarsa Coatings (KPC) is involved in the manufacturing and sale of paint and other products related to paint. The distribution office and warehouse of the Bandung (Cimahi) branch of PT Kansai Prakarsa Coatings (KPC) are located at Jl. Raya Cibabat No. 361, Cigugur Tengah Village, Cimahi Tengah District, Cimahi City. Companies need to implement effective asset management because it greatly influences their operations. By conducting proper asset management, companies can increase their profits since the assets play a crucial role in achieving maximum operational efficiency (Achmad & Hidayat, 2013). Based on previous studies, several issues have been

identified, namely that the closed warehouse owned by PT Kansai Prakarsa Coatings has poor ventilation and lighting, the load does not comply with applicable standards, and there are cases of overload, even though development could still be carried out. Paint is a flammable product, so it is essential to have safe storage facilities. Additionally, paint is also a product that has a chemical odor, making it necessary for the paint to be stored in a room with proper ventilation and air circulation.

LITERATURE REVIEW

Asset Planning

Asset planning consists of several stages: determining asset needs, evaluating the condition of existing assets, developing asset strategies, and capital funding and budgeting (Victorian Government, 1995). Planning and budgeting are interrelated and inseparable activities. Asset planning serves to provide direction and facilitate actions, such as purchasing new assets when needed, selling assets, and operating and maintaining assets effectively (Wahyuni, 2020). Proper asset needs planning can improve the quality of decisions made, thus making a project more focused on improving performance and achieving its objectives (Watkins et al., 2012).

Warehouse

A warehouse is a crucial component of a company. A warehouse can be considered effective and efficient in various ways, one of which is by serving as a place to store materials and products. Warehousing is essential for business because it can directly affect a company's revenue (Pitoy et al., 2020). A warehouse (noun) is a building used to store goods, or it is a place for storing raw materials, semi-finished products, or finished products (Hakim et al., 2017). According to the Regulation of the Minister of Trade of the Republic of Indonesia Number 90 of 2014 concerning the Arrangement and Development of Warehouses, a warehouse is a closed and/or open immovable space that is not open to the general public but is specifically designated for storing goods that can be traded.

Warehouse Criteria and Sustainable Warehouse Concept

Sustainable development emerges in response to various global environmental issues. Essentially, sustainable development refers to development aimed at meeting the needs of the present generation without compromising the interests and needs of future generations (Priyoga, 2010). A sustainable warehouse is a building designed by considering technological, business, social, environmental, and economic aspects, aimed at transforming the warehouse's function towards sustainability (Malinowska et al., 2018). The following are the dimensions used to assess warehouses in terms of their sustainable functions.

Table 1a. Dimensions of a Closed Warehouse Based on the Sustainable Warehouse Concept

Dimension	Indicator	Description
Energy Efficiency	a. Use of energy-saving lighting (such as LED lights). b. Reduction in the use of mercury-containing light bulbs. c. Implementation of motion sensor devices. d. Lighting controlled by a timer. e. Use of dusk-to-dawn switches. f. Use of skylights. g. Installation of solar panels or	A Class A warehouse must have a roof made of galvanized steel sheet/aluminum-coated steel sheet.

Table 1b. Dimensions of a Closed Warehouse Based on the Sustainable Warehouse Concept

Dimension	Indicator	Description
	the use of wind energy to convert sunlight into electrical energy	
Automatic Temperature Control	a. Installation of air conditioning units. b. Installation of temperature sensors.	A Class A warehouse must be equipped with a hygrometer and thermometer.
Use of Environmentally Friendly Materials	Use of low-emission paint for walls, floors, ceilings, and other surfaces.	a. An A-class warehouse must have a warehouse frame made of steel. b. An A-class warehouse must have plastered walls with a minimum height of 6 meters. fd c. An A-class warehouse must have warehouse doors made of steel or wood plates, with a minimum width of 4 meters, a minimum height of 3.5 meters, and at least 2 doors. d. An A-class warehouse must have a reinforced concrete floor
Use of Air Filtration Methods and Equipment	The use of air filtration equipment can be implemented by installing ventilation and air filters such as roof fans or exhaust fans, which function to remove hot air, dust, and serve as ventilation tools.	An A-class warehouse must have a ventilation distance from the roof between 0.75 – 1.25 meters.
Layout Efficiency	a. Optimization of route and storage zone selection. b. Creation of picking paths and order consolidation zones.	a. Class A warehouses must have main aisles with a minimum width of 1.5 meters. b. Class A warehouses must have cross aisles with a minimum width of 1 meter.
Employee-Friendly Zone Application	Create canteens, kitchens, bathrooms, and comfortable office areas for employees.	a. Class A warehouses must have dedicated toilets located outside

Table 1c. Dimensions of a Closed Warehouse Based on the Sustainable Warehouse Concept

Dimension	Indicator	Description
Employee-Friendly Zone Application	Create canteens, kitchens, bathrooms, and comfortable office areas for employees.	the warehouse area. b. Class A warehouses must have an administrative office located outside the warehouse area. c. Class A warehouses must be equipped with a guardroom. d. Class A warehouses must have a parking area with a minimum size of 500 m².
Application of Occupational Health and Safety (OHS)	a. Use of fire extinguishing equipment. b. Provision of first aid kits. c. Use of disaster warning equipment.	a. Class A warehouses must be equipped with a hydrant installation. b. Class A warehouses must be equipped with alarms or hazard signals. c. Class A warehouses must be equipped with fire extinguishers (APAR). d. Class A warehouses must be equipped with first aid kits (P3K). e. Class A warehouses must be equipped with lightning rods.

Costs

Cost is the expenditure sacrificed to acquire assets or the expenditure sacrificed to generate income (Massie et al., 2018). According to another opinion, cost is the sacrifice made in the production process, followed by recording, classification, summarizing, and presenting the costs (Febriana et al., 2016). Based on these two opinions, it can be concluded that cost is the total expenditure that must be incurred in a process, whether it's for procurement, production, or even distribution. Cost estimation plays an important role in project implementation (Sahid, 2017). This section on costs will explain demolition costs, construction costs, as well as facility and equipment procurement costs.

METHODOLOGY AND DATA COLLECTION

This project applies a descriptive method with a combination of qualitative and quantitative research approaches. To obtain the desired data according to the issues at hand,

several methods are used in data collection, such as questionnaires, observations, interviews, and document studies.

RESEARCH ANALYSIS

The determination of building asset and equipment needs is based on the sustainable warehouse concept to reduce negative impacts on the environment, health, and occupant comfort, thereby improving building performance. A sustainable building is one that considers location, design, construction, usage, maintenance, and demolition that are energy-efficient, both in terms of water energy and materials, so that the constructed building can create an efficient and comfortable indoor environment and provide long-term benefits for the owner, users, and society (Malinowska, 2018).

The need for building assets in PT Kansai Prakarsa Coatings' warehouse is due to overloading issues. Based on observations, there are high volumes of ready-to-ship paint products placed outdoors. The outdoor storage area for products is located in two different locations. The types of paint stored outdoors include wall paint, wood paint, and automotive paint. The need for warehouse expansion will be calculated based on the total rack requirement. Therefore, to calculate the warehouse expansion needs, the first step is to calculate the rack requirements. According to the calculations, the rack requirement for a total maximum capacity of 80 tons is 46 units. Currently, the total number of racks stored in the warehouse is 33 units. Therefore, PT Kansai Prakarsa Coatings needs to procure an additional 31 racks. Based on the calculation of the warehouse expansion needs, PT Kansai Prakarsa Coatings requires an expansion area of 372 m². Below is a detailed table of the total warehouse expansion needs for PT Kansai Prakarsa Coatings (Table 2).

Table 2. Area of the New Warehouse Building

No.	Specification	Old Size	Additional Size
1	Warehouse Building Length	34 m	31 m
2	Warehouse Building Width	12 m	12
3	Main Aisle Width	4 m	4
4	Cross Aisle Width	3 m	3
Total Area of Old Warehouse: 408 m² Total Area of New Warehouse: 772 m²		34 x 12	65 x 12

In addition to the building expansion needs, PT Kansai Prakarsa Coatings needs to procure sustainable warehouse equipment that is also in compliance with SNI standards. The procurement of this equipment includes material handling and other warehouse support equipment. The following is a detailed list of the warehouse equipment needs for PT Kansai Prakarsa Coatings (Table 3).

Table 3a. Warehouse Equipment Requirements

No.	Equipment	Specifications	Quantity
1	Forklift	a. Maximum load capacity: 3.2 tons. b. Maximum lift height: 3 m. c. Fork unit length: 4.15 m. d. Unit width: 1.48 m.	2
2	Hand Pallet	a. Maximum capacity: 2,000 kg. b. Dimensions (L x W x H): 1620 x 685 x 400.	2
3	Metal Racks	a. Dimensions (L x W x H): 3 x 1 x 3. b. Used for storing products inside the	31

Table 3b. Warehouse Equipment Requirements

No.	Equipment	Specifications	Quantity
		building.	
4	Wooden Pallets	Helps in moving products.	124
5	Air Conditioner (AC)	Helps with air circulation activities.	4
6	Roof Exhaust Fan	a. Material: Stainless Steel 201. b. Neck size: 16".	5
7	Danger Alarm	Provides a warning in case of an accident.	1
8	Fire Extinguisher (APAR)	Small fire control tool.	4
9	First Aid Kit (P3K)	First aid box.	2

Below is the visual of the old warehouse before development, showing both the area expansion and the implementation of the sustainable warehouse concept, including the application of the seven dimensions. The dimensions are detailed in Table 1.

Figure 1. Documentation of the Old Warehouse Interior

The following is the visual of the new warehouse after development, showing the area expansion and the implementation of the sustainable warehouse concept.

Figure 2. Illustration of the New Warehouse Interior

Cost Estimation for Building Asset and Equipment Needs

Here is a breakdown of the demolition costs for the warehouse expansion project at PT Kansai Prakarsa Coatings.

Table 4. Estimated Warehouse Demolition Costs

No.	Description of Work	Unit	Quantity	Unit Price	Total Price (Rp)
1	Wall Demolition	m^2	67	150,000	10,050,000
2	Roof Demolition	m^2	10	150,000	1,500,000
3	Debris Removal	m^3	10	225,000	2,250,000
4	Labor (3 Days of Work)	Person	2	150,000	900,000
	Total				14,700,000

Below is the breakdown of the construction costs for the warehouse expansion project at PT Kansai Prakarsa Coatings.

Table 5. Estimated Warehouse Construction Costs

No.	Description of Work	Unit	Quantity	Unit Price (Rp)	Total Price (Rp)
1	Warehouse Expansion Construction	m^2	372	3,131,892	1,165,063,960
2	Parking Area Repairs	m^2	216		
	a. Pore Block	m^2	216	135,000	29,160,000
	b. Grass Block	m^2	216	154,000	33,264,000
	c. Japanese Grass	m^2	216	30,000	6,480,000
	Total				1,233,967,960

The equipment procurement for the project, particularly for the warehouse equipment, is done using the unit installed method. The market prices used are based on the market prices listed on websites and marketplaces.

Table 6. Estimated Warehouse Equipment Procurement Costs

No.	Equipment	Quantity	Unit Price (Rp)	Total Price (Rp)
1	Toyota Forklift 62-8FD30 (3 tons)	2	185,000,000	370,000,000
2	Power Tekindo Hand Pallet	2	3,095,000	6,190,000
3	Metal Racks	31	5,056,000	156,736,000
4	Wooden Pallets	124	46,000	5,704,000
5	Sharp AC AH – A5UCY	4	2,300,000	9,200,000
6	Roof Exhaust Fan	5	316,000	1,580,000
7	Philips LED Lights (18 Watt)	12	60,000	720,000
8	Danger Alarm	1	835,000	835,000
9	Fire Extinguisher (APAR)	4	980,000	3,920,000
10	First Aid Kit (P3K)	2	150,000	300,000
Total				546,248,000

CONCLUSION

Based on the results of the project to determine the building asset and warehouse equipment needs for PT Kansai Prakarsa Coatings, based on the sustainable warehouse concept, the following conclusions can be drawn:

1. Based on the calculations, the total additional area needed for the warehouse building is 372 m². This calculation is estimated based on the product load stored inside and outside the warehouse building. The warehouse expansion is developed based on the sustainable warehouse concept and in accordance with SNI warehouse standards. As for the warehouse equipment, PT Kansai Prakarsa Coatings needs to procure ventilation equipment, safety equipment, lighting equipment, as well as racks and material handling equipment.
2. The project cost estimation is calculated using the square meter method and the unit installed cost method. The cost estimation for this project includes demolition, construction, and procurement costs. The demolition cost for this project is Rp. 14,700,000. The construction cost is Rp. 1,233,967,960. The procurement cost is Rp. 546,248,000. Therefore, the total cost required to complete this project is Rp. 1,794,915,960.

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