



## Application of Distribution Logistics Information System Disaster in Pidie Jaya BPBDs

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### **Abstract**

Logistics distribution at the time of the disaster Pidie Jaya there are several issues that need to be considered, among which are irregular establishment of shelters, lack of coordination with the relevant sectors, the data the victims were not recorded properly, and logistics distribution process does not correspond to the needs of victims in the disaster area. These problems occur because there is no information to connect to the data of victims across relevant sectors, aid which has been fulfilled until the logistics are very urgent in the disaster area. Distribution of disaster logistics information system is indispensable to achieve an effective and efficient distribution. Application of this information system consists of several stages of the design, implementation, and testing. This research was conducted in the office BPPD Pidie Jaya district. Distribution logistics information system applied will make it easier and speed up the process of recording the distribution logistics in times of disaster. Testing was conducted using the System Usability Scale (SUS) with average values obtained 78.30. This indicates that the level of use of this information system is acceptable and is very easy to use by the user.

**Keywords:** Information Systems; Logistics Distribution; Disaster

### **1. Introduction**

Disaster is an event or events that threaten the lives and livelihood, causing loss of life, loss of property, damage to the environment and also the impact of trauma or psychological, caused by natural factors, non-natural or act than humans (Law of the Republic of Indonesia Number 24 the Year 2007). Earthquakes, tsunamis, volcanic eruptions, and floods are the successive disasters occur in Indonesia. Damage, loss of property to victims of a single soul continues to rise. The earthquake and tsunami are categorized into large-scale disasters, which handling process must be done quickly because it has an impact far greater public (Jiang et al., 2012).

On December 7, 2016, tectonic earthquakes in Pidie Jaya, have made the Meteorology, Climatology, and Geophysics (BMKG) at 05:03:35 pm The epicenter was located at 5.25°LU and

96.24°BT with magnitude 6.5 magnitude at a depth of 10 km. The earthquake was centered on land and does not result in a tsunami (BMKG Release, 2016).

Earthquake impact on the three districts of Pidie Jaya district, Pidie, and Bireuen. The quake caused 104 people died (Pidie Jaya 97 people, Pidie 5 People, and Bireuen 2 People), 186 souls serious injuries and 789 minor injuries, as well as causing damage to the sectors of housing, infrastructure, economic, social and thematic (BNPB, 2017 ). At the time of the emergency response, logistics distribution system related information is necessary, to facilitate and expedite the process of distribution of the basic needs of victims who are in refugee camps. Therefore, any emergencies should the process of handling the logistics related to distribution using an application (Raich et al., 2014). An efficient logistic distribution system plays an important role in maintaining and managing the flow of supply and distribution logistics to victims who are in refugee camps in order to reduce the negative impact of (Ozguven & Ozbay, 2013).

From observation and experience of researchers at the time of the rapid response emergency response action earthquakes Pidie Jaya, many obstacles encountered in the field of the logistics distribution process, causing the logistics are not distributed properly. The absence of a system of integrated logistics distribution information also resulted in meeting the basic needs of victims does not correspond with the real conditions of refugees. The absence of basic data needs of the people affected and limited information logistics inventory in the warehouse or the postmaster so that the donors have difficulty in determining the most pressing needs in the field.

At the time of the emergency earthquake Pidie Jaya, the BPBDs not yet have a system to record the distribution of logistics that could be easily accessed by the public, then the writers would, therefore, be to devise a system of information distribution logistics that will be applied in BPBDs Pidie Jaya.

## **2. *stages Research***

In this study, the authors will perform several steps to complete the application process in disaster logistics distribution system BPBDs Pidie Jaya. As for the stages of research as follows:

### **1. Design**

Earlier, the author has approached, observations, and analyze the system running in BPBDs Pidie Jaya. But the BPBDs not use an application in the process of recording the distribution of disaster logistics. They still rely on the manual recording.

After the assessment, observation, and data collection were done at BPBDs Pidie Jaya, the author will do designing a disaster logistics distribution system that will be applied in BPBDs Pidie Jaya.

### **2. Application**

Once the system design, researchers will implement the system in government agencies that BPBDs Pidie Jaya.

### **3. Examination**

Testing is an important part of building software or applications. The purpose of this test is done to ensure quality rather than the software built. In this study, the authors use testing System Usability Scale (SUS).

System Usability Scale (SUS) is a testing method used to test software with a facility. SUS can be used in conducting independent testing technology both in hardware, software, websites and even mobile devices (Sauro, 2011 in Ependi et al., 2018).

SUS is applied in the form of questionnaires, wherein the questionnaire contained 10 questions with five possible answers ranging from strongly disagree to strongly agree with. The shape rather than questions System Usability System (SUS) can be seen in Table 1 (Brooke, 1996 in Yudha et al., 2017)

**Table 1 Questionnaire Questions SUS**

Name:..... Education:..... office:.....	Strongly disagree	Strongly agree
1. I feel that this application will more often I use	1	2 3 4 5
2. I feel that the application is too complex, but can be made simpler	1	2 3 4 5
3. I find this app easy to use		
4. I need help from technical staff to be able to use this application		
5. I found the various functions of this application is integrated with both		
6. I feel a lot of mismatches in this application		
7. I feel most people will easily learn this application very quickly		
8. I find this application very complicated to use		
9. I feel very confident to use this application		
10. I need to learn before you start to use this application		

The use of SUS questionnaire involving a minimum of 5 users that includes an end user (end user) to system programmers. SUS questionnaire used after the respondent had the opportunity to use the system. SUS measurement is done by adding up the value of each item. The value of each item is in a range of 1 to 5. For odd-numbered item value of the items is the result of valuation user for the item minus one. For even-numbered item value of the items is the result of five (5) less the value of the user for the item. Total score 10 item number is then multiplied by 2.5 to produce a final score in the range of 0-100. The range of values SUS can be seen in Figure 1 (Brooke, 1996 in Yudha et al., 2017)

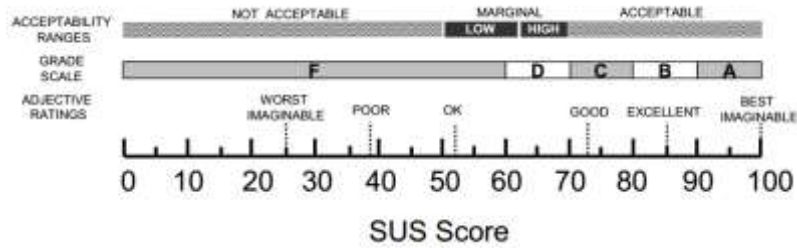


Figure 1 Range of Values SUS

3. Results and Discussion

Entity Relationship Diagram (ERD)

Entity Relationship Diagram(ERD) is a diagram showing the relationship Atar relevant entities in a system. The entity is the process of collecting data to produce information as a support system. Entities involved and relationships that appear here will then be used in designing the necessary database needs. ERD distribution logistics information systems disaster can be seen in Figure 2.

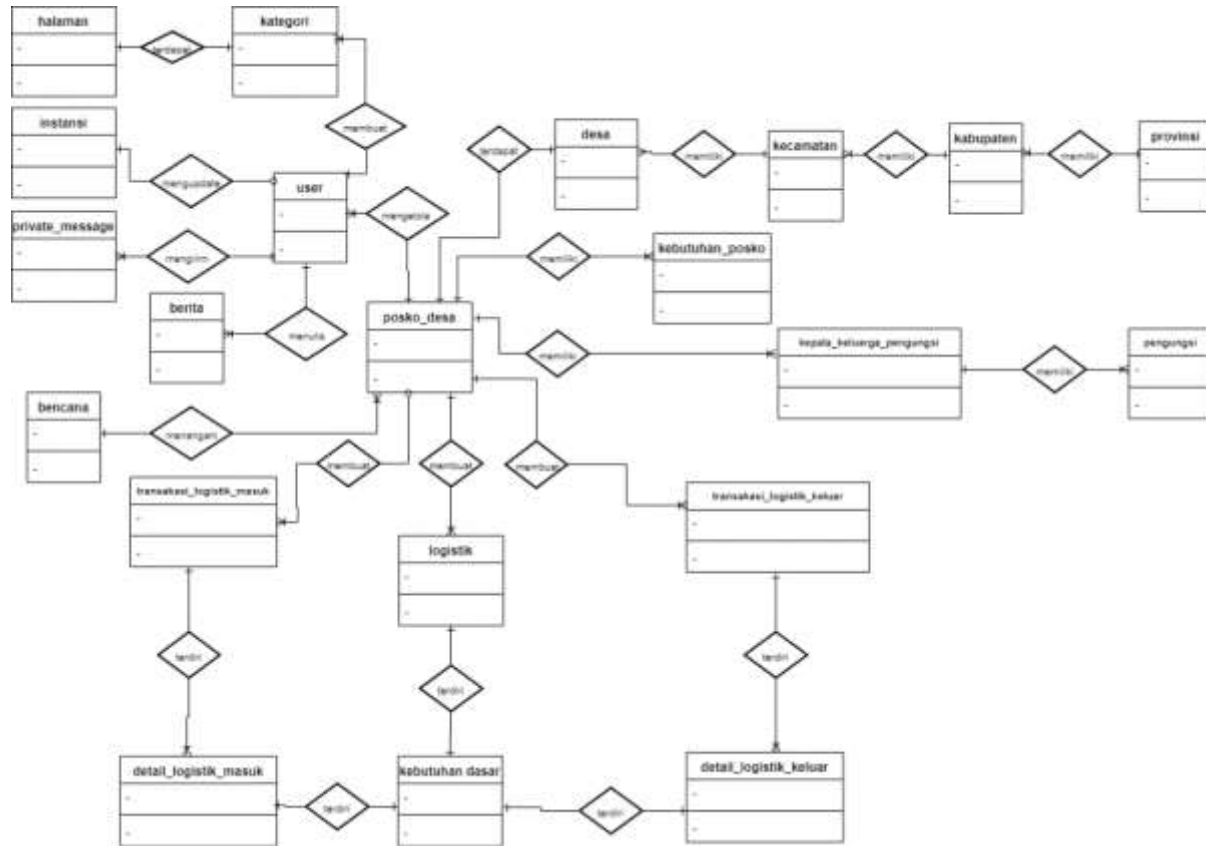
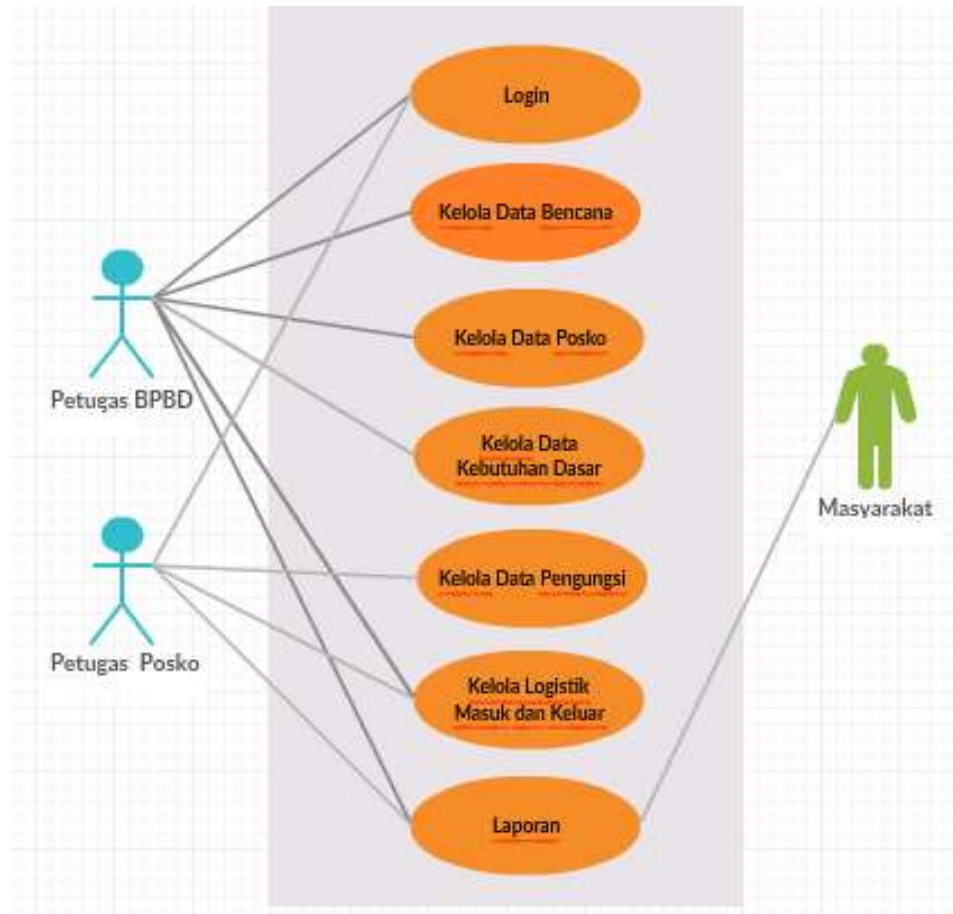


Figure 2. Entity Relationship Diagram

Use Case Diagram

Use case diagrams modeling to demonstrate the interaction for the user in using the system. Use case serves to determine who and what can be done within the system. Here's a use case diagram image for distribution logistics information systems disaster in BPBDs Pidie Jaya.



**Figure 3 Use Case Diagram**

### *System Architecture*

To simplify the process of designing a system is necessary to make the architecture rather than the system. This architecture will describe all the processes that exist within the system. The designed system is divided into 3 parts: public interface, the interface, and the interface BPBDs post. The system architecture of distribution and logistics information can be seen in Figure 4.

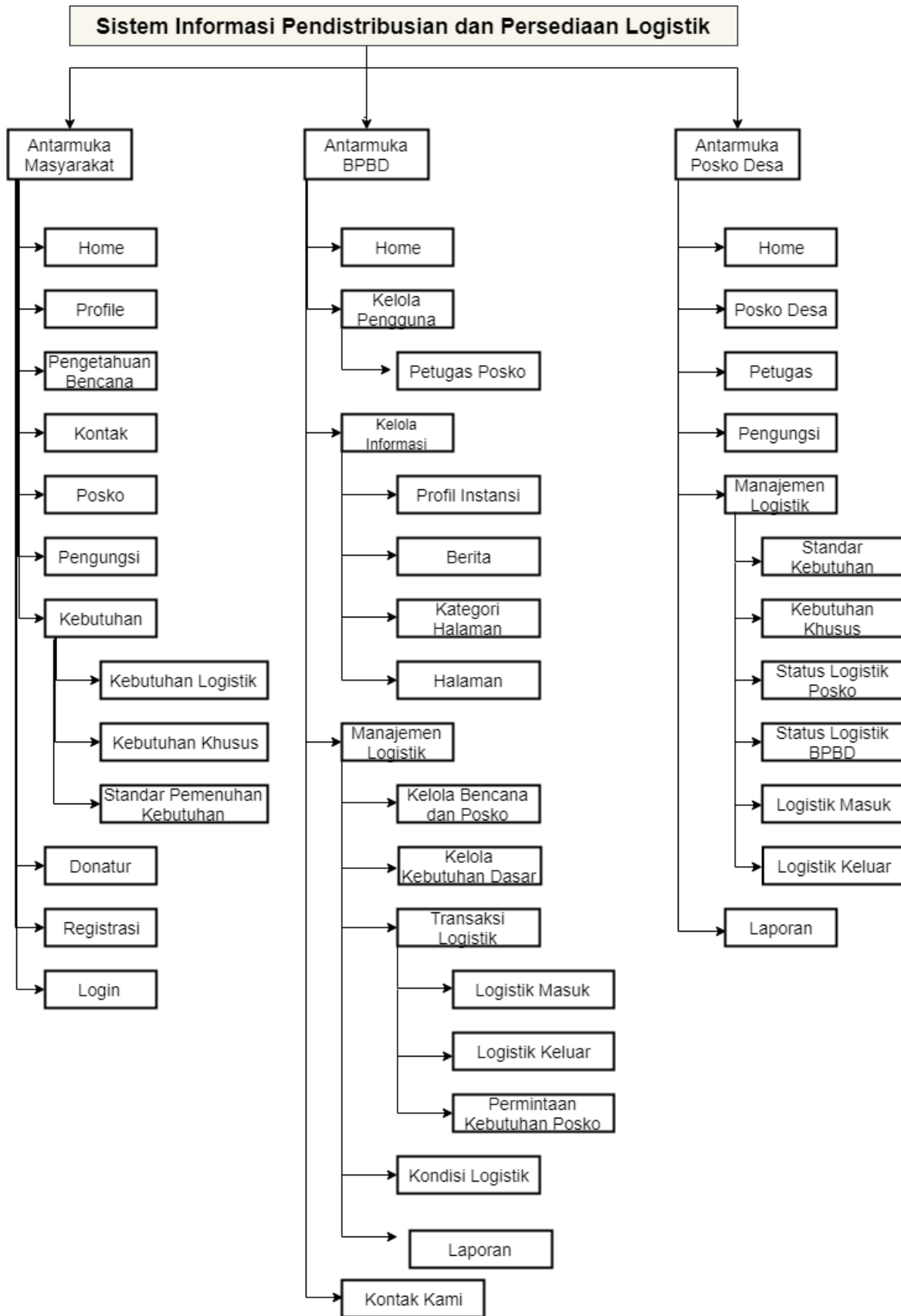


Figure 4 The system architecture

## Display Home

The main page is a page interface to view and access the various menus provided by the system.

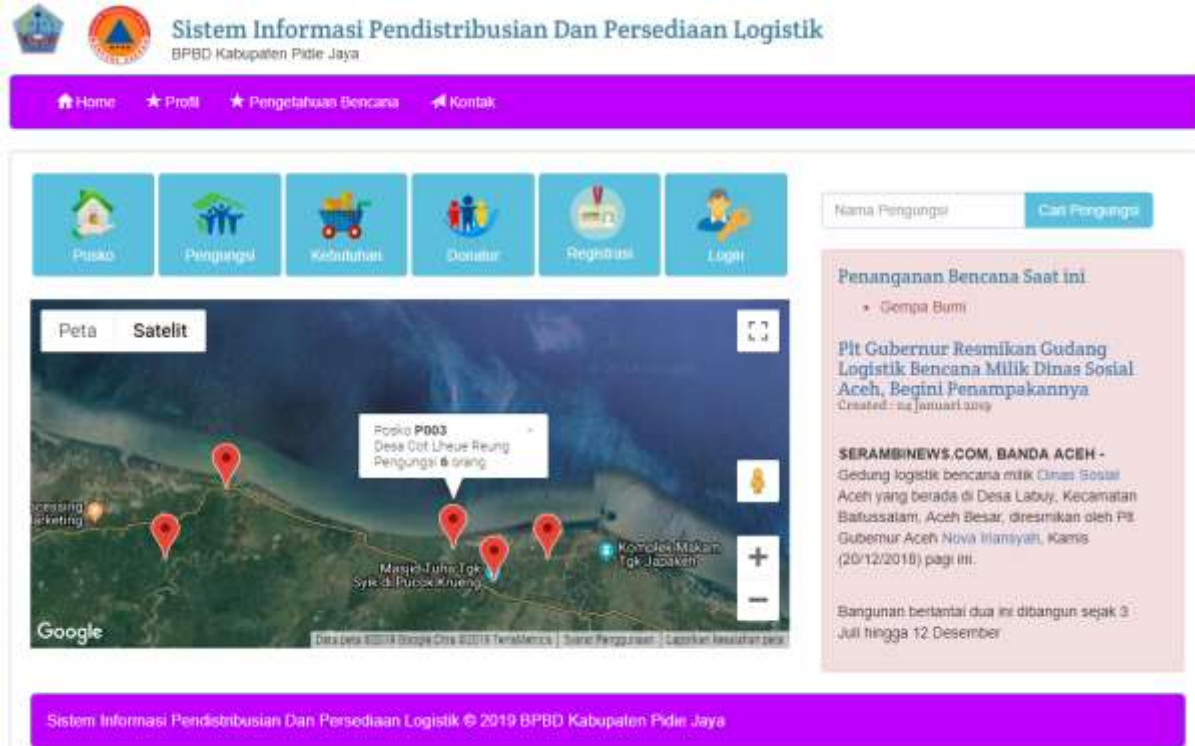


Figure 5 Display main page

1. menu Command Post  
Menu posts function to see the village post the data registered in the system.
2. menu Refugees  
Refugees menu function to see all the data of refugees registered in each post, which will also be visible on this page the number of refugees by age group and gender. Thus it would be easier for everyone who wants to provide logistical assistance in determining the number and categories of aid distributed.
3. menu Needs  
Menu functions need to see data on the number and logistic requirements in each post. This menu is available in the submenu to see the special needs of refugees if there are refugees in these posts that require specialized logistics beyond the basic needs that have been provided.
4. menu Donors  
The menu function to view the data donors who have contributed logistic support to the disaster site. Thus the contributors will be easier to know whether their own until the manager of disaster relief logistics location.
5. Menu Registration Officer  
Menu registration clerk serves to make a submission to the BPBDs to request made and activated as the manager of the post. In this menu, anyone can register as a manager of the post, but before becoming a manager, BPBDs officer will verify the data first to be activated as a responsible post.
6. menu Login  
Login menu serves as the initial form for BPBDs officer and clerk post to go to the next page. Login menu is divided into two levels:
  - level BPBDs
  - level Post

The second level has the functions and responsibilities of each. Officers are expected to fill in your user name and password to sign in to the next page.

### Pageviews BPBDs

The following researchers will explain some of the menu available at the clerk BPBDs page, where the page is the home page for officers BPBDs after login. BPBDs officer on this page will make the process of news management, disaster management, rural post activation, recording incoming transaction logistics, logistics out and issue reports as required. The officer BPBDs page views can be seen in Figure 6.



**Figure 6** Page clerk BPBDs

1. Menu Manage News  
Menu manage news is a form provided by the system to manage and inform the news to the public in the form of a narrative that is easy to understand. News inputted by the clerk will be displayed on the home page when accessing the system.
2. Menu Manage Disasters and Post Village  
Disaster management menu is a page provided by the system to perform data entry and data post-disaster.
3. Manage menu Basic Needs  
Menu governance serves as a basic requirement set standards logistical assistance for disaster victims. Where there is a menu with this, will guide the type and quantity supplied logistical assistance to disaster victims.
4. Menu Logistics Sign  
Logistics menu entry is a page where the clerk will record incoming transaction data logistics, good logistics is channeled from the government or public assistance.
5. Menu Logistics Exit  
Menu logistics out a page where the clerk will record transaction data logistics out, good logistics officer posts were distributed to villages and communities.
6. Menu Logistics Conditions  
The menu is the logistics function to see logistics data are available both in the post and in the warehouse. With the number of refugees in conditions of evacuation shelters, officials BPBDs can



easily know the state of logistics were provided and the number of required logistics for disaster victims in the coming days.

#### 7. Menu View report

Menu view report function to view and print a report related to the distribution logistics in times of disaster. The yard personnel can view and print reports as a data disaster, the data post, a data clerk, Data refugees, the data needs of the post, this time logistics condition data, logistics data entry, exit, and data logistics donors.

#### *Village Post Page Views*

The following researchers will explain some of the menu available at the village post page, this page is the home page for the village post officer after login. This is where the village post officer will make the process of managing the post villages, refugee management, recording logistics transactions entered, recording the logistics out and issue reports as required. The village post page view can be seen in Figure 7.



**Figure 7 Display posts pages village**

#### 1. Menu Manage Post Village

The menu is a village post management officer post do input page related identity data than these posts such as recording-related post name, address, the person in charge, and the estimated number of refugees.

#### 2. Manage menu Refugees

Menu governance of refugees is a place for village post manager to perform inputting a list of names of families displaced by the card respectively. The names of the refugees to be inputted based on the location where they put the tents so that the data will be recorded refugees in times of disaster quickly and accurately. As for the logistics menu entry, exit logistics and menu refer to the report, works the same way as described BPBDs page menu.

#### *Testing the System Usability Scale (SUS)*

SUS testing conducted to evaluate the effectiveness of the system to the user, in order to see how far the user's understanding of the system that has been built. SUS testing was performed involving 22

respondents with three criteria that respondents who understand the system, Pijay BPBDs staff, and volunteers. Tests performed after the respondents see an explanation or direct use of the system.

As for the method of calculating the SUS questionnaire results are as follows:

1. Determining the weight value for every question has been answered by the respondents, Strongly Disagree worth 1, Disagree worth 2, Ragu-Ragu is worth 3, 4 and valuable Agree Strongly Agree worth 5.
2. The results of data processing is done by:
  - a. Question odd number, the score value is selected each answer minus 1.
  - b. Question number is even, the value of each question score is 5, less the value of the selected answer scores.
  - c. The results of the scores of each question are multiplied by 2.5 and then summed, the result of the sum ranges between 0-100.
  - d. Calculation of the total number of SUS values taken from the sum value of all respondents and then divided by the total number of respondents.
  - e. Here is the result of the calculation process SUS method for disaster logistics distribution system in Pidie Jaya BPBDs using 22 respondents. The calculation process can be seen in table 2

**Table 3 Results Recap questionnaire SUS**

	Pertanyaan											Total SUS
		1	2	3	4	5	6	7	8	9	10	
Responden	1	10	10	7,5	5	10	10	7,5	10	7,5	7,5	85,00
	2	7,5	7,5	10	7,5	10	10	10	10	7,5	5	85,00
	3	10	7,5	10	5	10	10	10	10	7,5	7,5	87,50
	4	10	7,5	10	7,5	10	10	10	10	7,5	7,5	90,00
	5	7,5	2,5	7,5	0	10	7,5	7,5	5	7,5	0	55,00
	6	10	10	10	7,5	10	10	10	10	10	10	97,50
	7	7,5	7,5	7,5	5	7,5	7,5	10	10	7,5	5	75,00
	8	7,5	5	7,5	5	10	10	10	7,5	5	5	72,50
	9	5	5	7,5	5	10	10	7,5	7,5	5	5	67,50
	10	7,5	7,5	7,5	5	10	10	7,5	7,5	7,5	5	75,00
	11	10	7,5	10	5	10	7,5	7,5	7,5	7,5	5	77,50
	12	5	5	7,5	5	7,5	10	7,5	10	7,5	5	70,00
	13	10	10	10	5	10	10	10	7,5	7,5	5	85,00
	14	7,5	5	10	5	10	10	10	10	10	5	82,50
	15	5	7,5	10	10	10	10	5	7,5	10	2,5	77,50
	16	10	7,5	10	5	7,5	10	7,5	7,5	7,5	7,5	80,00
	17	7,5	7,5	7,5	2,5	7,5	7,5	10	7,5	7,5	5	70,00
	18	7,5	7,5	10	2,5	10	10	10	10	7,5	5	80,00
	19	10	10	10	7,5	10	10	10	10	7,5	5	90,00
	20	7,5	7,5	10	5	7,5	7,5	10	10	7,5	5	77,50
	21	7,5	5	7,5	5	7,5	10	7,5	7,5	5	5	67,50
	22	7,5	7,5	7,5	5	10	7,5	10	7,5	7,5	5	75,00
	<b>TOTAL</b>											<b>1722,50</b>
	<b>Rata-Rata Nilai SUS (Total SUS / Jumlah Responden)</b>											<b>78,30</b>

SUS evaluation calculation results obtained by the average value of 78.30. This indicates that the level of use of this information system is acceptable and is very easy to use by the user.

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