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MATERIAL MANAGEMENT SYSTEM ON NARROW LAND IN THE TOTAL REHAB PROJECT OF THE NEW PEMURUS HEALTH CENTER

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ABSTRACT

Several methods are commonly used to overcome material management system problems in projects, these methods include the material selection stage, supplier selection, material purchase stage, material delivery stage, material acceptance stage, material storage stage, material production stage, and material inventory level. Before entering the material management system, you must determine what materials are entered into the system, one of which uses Pareto analysis. Pareto diagrams are a standard method of quality control to get the most out of it or choose the main problems and after all are considered as a simple approach that can be understood by less-educated workers, as well as as a tool for solving in a fairly complex field. From the results of Pareto analysis calculations, it is known that the types of materials included in the material management system are Reinforced Iron, Formwork, and Ready Mix. Good material management, it will make it easier to handle work based on procedures that have been arranged systematically. With a clear and systematic management format, it will be able to minimize the occurrence of things that will cause losses on the part of the company.

Keywords: *Pareto Analysis, Management System, Materials.*

1. INTRODUCTION

Construction materials in a project include materials that will later become fixed materials in the structure (permanent materials) and materials needed in building a project but not part of the structure (temporary materials). In a construction project, project management is necessary both in the planning and implementation of construction projects. Several methods are commonly used to overcome material management system problems in projects, these methods include the material selection stage, supplier selection, material purchase stage, material delivery stage, material acceptance stage, material storage stage, material production stage, and material inventory level. Pareto diagrams are a standard method of quality control to get the most out of it or choose the main problems and after all are considered as a simple approach that can be understood by less-educated workers, as well as as a tool for solving in a fairly complex field.

In the Total Rehab project, the Pemurus Baru Health Center does not have land to put materials on the project land. The land area in the Total Rehab project of the Pemurus Baru Health Center has a size of 18m x 38m, while the building area has a size of 17.5m x 33m. In this case, the contractor initiated by placing materials on the land next to the project. So managing materials on land not the realm of the project, it must be very careful and meticulous in every work carried out in the field. Using land in addition to the project must have permits and contracts from the parties concerned. The land used is the official land of Pemurus Baru Village, South Banjarmasin.

In using the village land, the project party must obtain permits and contracts from the new village. The related contract, namely if there is any damage to the village land caused by the project party, must be replaced as it was in its original form. If the contract is approved, the village land can be used as a place to put project materials. In managing materials in and out, you must carefully and carefully so that there is no accumulation of excess material on narrow land so that the project can run smoothly without the constraints of material shortages in every work.

2. THEORITICAL STUDY

Materials Management Stage

In material management on the project, some several stages and processes will be carried out, before entering the material management system, you must first use the Pareto method to determine what materials will be included in the material management system. The material management system includes several stages that will be carried out so that the project can run optimally with the help of the stages of the material management system on the project, including the material selection stage, supplier selection stage, material purchase stage, material delivery stage, material receipt stage, material storage stage, material expenditure stage, and the stage of maintaining the level of material inventory consumed.

Table 1 Material Selection

No	Jenis Material	Satuan Jual	Kebutuhan Material
1	SEMEN	Zak	-
2	PASIR	M3	-
3	AIR	Ltr	-
4	BATU PECAH 1-2 cm (Kerikil)	M3	-
5	BATU PECAH 2-3 cm (Kerikil)	M3	-
6	PLYWOOD (6mm)	Kpg	-
7	PLYWOOD (8mm)	Kpg	-
8	PAKU 1½" - 4"	Kg	-
9	BESI TULANGAN Ø8	Btg	-
10	BESI TULANGAN Ø10	Btg	-
11	BESI TULANGAN D12	Btg	-
12	BESI TULANGAN D16	Btg	-
13	KAYU PANCANG (GALAM)	Btg	-

Table 2 Supplier Selection

No	Jenis Material	Satuan	Toko A Jasa Rimba (Rp)	Toko B Toko Family (Rp)	Toko C Mitra Utama (Rp)	Harga Termurah	
						Harga	Toko
1	Semen	Zak					
2	Pasir	M3					
3	Air	Ltr					
4	Batu Pecah 1-2 cm	M3					
5	Batu Pecah 1-2 cm	M3					
6	Plywood 6mm	Kpg					
7	Plywood 8mm	Kpg					
8	Paku 1½" – 4"	Kg					

Table 3 Material Purchases

Surat Perjanjian Pembelian Material

Pengirim : ULIS

Tanggal : 17 Maret 2021

Hasil Pemeriksaan penerimaan material sebagai berikut :

NO	Jenis Material	Satuan	Harga Satuan (Rp)	Jadwal Pengiriman
1	Semen	Zak		
2	Pasir	M3		
3	Air	Ltr		
4	Batu Pecah 1-2 cm	M3		

Table 4 Material Acceptance

CHECKLIST INSPEKSI PENERIMAAN MATERIAL

Pengirim : ULIS

Tanggal : 17 Maret 2012

Hasil pemeriksaan penerimaan material sebagai berikut :

NO	Jenis Material	Kualitas	Ukuran	Kuantitas	Keterangan
1	Semen	✖		25 Zak	Rusak 5 zak
2	Pasir	✓		10 M3	ok
3	Batu Pecah 2-3 cm	✓		315 M3	ok
4	Triplek (9mm)	✓		360 kpg	ok
5	Besi Tulangan D25	✓		180 btg	ok

Penerima Material,

Petugas Gudang

Table 5 Material storage

Nama Material	No. Material
Semen portland	001 1
Agregat halus (pasir)	002 3
Agregat kasar (batu pecah 1- 2 cm)	003 3
Agregat kasar (batu pecah 2- 3 cm)	004 3
Triplek 3 mm	005 1
Triplek 9 mm	006 1
Kayu Pancang	007 2
Paku 2”-5”	008 1
Seng Gelombang	009 2
Besi Tulangan D13	010 3
Besi Tulangan D16	011 3

3. METHOD

The conclusion of some discussion of the formulation of the existing problem can be seen in the flowchart in Figure 1.

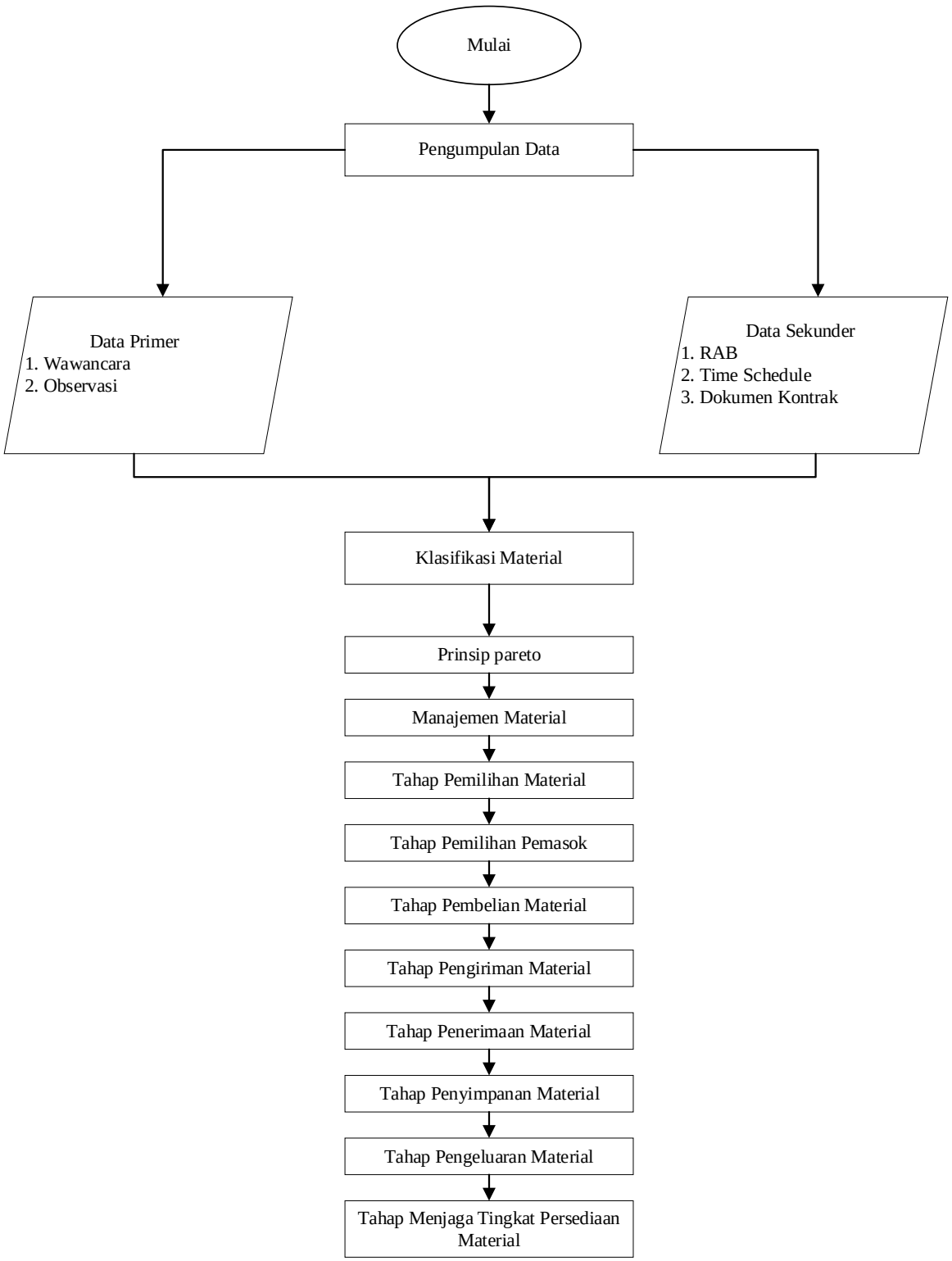


Figure 1 flowchart Research Methods

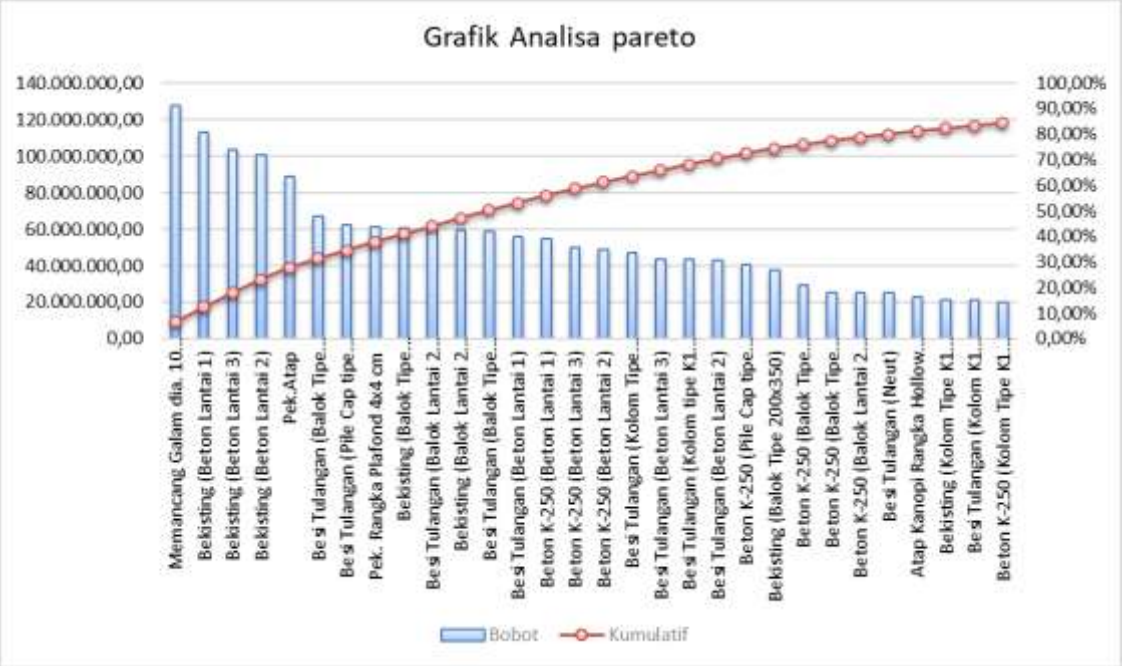
4. RESULT AND DISCUSSION

Secondary data in the form of a Budget Plan for the Total Rehab project of the New Pemurus Health Center. The data is used to determine the work items to be analyzed. Analysis of these work items is based on Pareto Analysis. Unit analysis of work requires the price of materials. Data on the cost of work on the project will be compared with the cost of work from research results. Time Schedule is used to regulate the flow of material entry and exit per work item. The Contract Document is used to justify narrow land in the Total Rehab project of the Pemurus Baru Health Center.

the. Analyzes Pareto

The results of the selection of materials to be included in the material management system through Pareto analysis.

Table 1 Pareto Analysis Results



No	Uraian Pekerjaan	Jumlah Harga Rp	Bobot (%)	Kumulatif Bobot %
A	Besi Tulangan	575.282.688,51	30,02	30,02
B	Bekisting	627637473,5	32,747	62,76
C	Beton	366147950,7	19,104	81,87

Uraian Pekerjaan	Volume	Satuan
Tulangan Besi		
Tulangan Besi Lantai 1	22.967,99	Kg
Tulangan Besi Lantai 2	12.761,94	Kg
Tulangan Besi Lantai 3	10.834,76	Kg
Tulangan Besi Lantai DAK	1.648,90	Kg
Bekisting		
Bekisting Lantai 1	1.286,26	m^2
Bekisting Lantai 2	898,05	m^2
Bekisting Lantai 3	841,64	m^2
Bekisting Lantai DAK	143,63	m^2
Beton		
Beton Lantai 1	135,70	m^3
Beton Lantai 2	77,18	m^3
Beton Lantai 3	66,92	m^3
Beton Lantai DAK	12,26	m^3

b. Material Selection

The results of material selection after going through Pareto analysis

Table 2 Material Selection Results

No	Jenis Material	Satuan	Kebutuhan Material
	Tulangan Besi		
1	Besi Tulangan (Pile Cap tipe PC-1)	kg	5151,37536
2	Besi Tulangan (Pile Cap tipe PC-2)	kg	159,09
3	Besi Tulangan (Neut)	kg	2057,6724
4	Besi Tulangan (Sloof Pengikat 20x20)	kg	700,52
5	Besi Tulangan (Balok Tipe 200x350)	kg	5540,09
6	Besi Tulangan (Beton Lantai 1)	kg	4608,31
7	Besi Tulangan (Beton Meja)	kg	24,86
8	Besi Tulangan (Kolom Tipe K1 300x300)	kg	3894,08256
9	Besi Tulangan (Kolom Praktis 10/10 Lt.1)	kg	361,54
10	Besi Tulangan (Balok Latei 10/10 Lt.1)	kg	231,9
11	Besi Tulangan (Kanopi Lantai 1)	kg	91,24
12	Besi Tulangan (Lantai IPAL)	kg	101,57
13	Besi Tulangan (Neut untuk Teras)	kg	45,74
14	Besi Tulangan (Balok Lantai 2 200x350)	kg	4891,1
15	Besi Tulangan (Balok Lantai 2 150x300)	kg	232,0288
16	Besi Tulangan (Beton Lantai 2)	kg	3512,11429
17	Besi Tulangan (Kolom tipe K1 300x300 Lt.2)	kg	3591,78
18	Besi Tulangan (Kolom Praktis 10/10 Lt.2)	kg	174,59
19	Besi Tulangan (Balok Latei 10/10 Lt.2)	kg	92,16
20	Besi Tulangan (Kanopi Lantai 2)	kg	4836,96
21	Besi Tulangan (Balok Tipe 200x350 Lt.3)	kg	230
22	Besi Tulangan (Beton Lantai 3)	kg	3593,37143
23	Besi Tulangan (Kolom K1 200x200 Lt.3)	kg	141,23
24	Besi Tulangan (Kolom Praktis 10/10 Lt.3)	kg	1727,9005
25	Besi Tulangan (Balok Latei 10/10 Lt.3)	kg	509,14
26	Besi Tulangan (Balok Pengunci Pagar Lt.3)	kg	71,7636
27	Besi Tulangan (Kanopi Lantai 3)	kg	83,9
28	Besi Tulangan (Balok Tipe 200x300 Ring Balk)	kg	11,72
29	Besi Tulangan (Balok Tipe 200x200 Ring Balk)	kg	9,58
30	Besi Tulangan (Balok Tipe 15/25 Ring Balk)	kg	5
31	Besi Tulangan (Balok Tipe 10/15 Ring Balk)	kg	516,11
32	Besi Tulangan (Pek.Lantai Beton, Lantai Dak)	kg	340,09
33	Besi Tulangan (Pek.Tangga)	kg	371,37

c. Supplier Selection

Comparison between the two material suppliers that will be chosen to be the place of purchase of materials on the project.

Table 2 supplier selection

No	Jenis Material	Satuan	Toko A Harapan (Rp)	Toko B Sentosa Karya (Rp)	Harga Termurah	
					Harga	Toko
1	Semen	Zak	50000	51000	50000	A
2	TR-30	Zak	125000	125000	125000	A,B
3	Bendrat	Roll	350000	375000	350000	A
4	Paku 1½" – 4"	Kg	20000	25000	20000	A
5	Aplus	Zak	60000	63000	60000	A
6	Plywood 6mm	Kpg	61000	65000	61000	A
7	Plywood 9mm	Kpg	95000	98000	95000	A
8	Lem Rajawali	Bks	18000	17500	17500	B
9	Besi 8 Polos	Btg	52000	55000	52000	A
10	Besi 10 Polos	Btg	65000	67000	65000	A
11	Besi 12 Ulir	Btg	118500	119500	118500	A
12	Besi 16 Ulir	Btg	220000	223000	220000	A
13	Bata Ringan	M3	745000	750000	745000	A

d. Purchase of Materials

Recapitulation of material purchases per month to detect material purchases from any where and find out the number of materials that have been purchased.

Table 3 Material Purchases

LAPORAN MATERIAL PROYEK PUSKESMAS PEMURUS					
OKTOBER 2021					
NO	**TANGGAL**	**KETERANGAN**	**VOLUME**	**SATUAN**	**KET**
1	01/10/2021	Paku 1 1/2"	2	kg	Harapan
		Paku 2"	2	kg	Harapan
		Paku Beton 2"	2	ktk	Sentosa Karya
2	02/10/2021	Pasir Cor Halus	1	ret	Bankal Mandiri
		Paku 1 1/2"	2	dus	
		Semen Tonasa	10	zak	Sentosa Karya
3	04/10/2021	Semen Tonasa	20	zak	
		Batu Split	1	ret	
		Pasir Cor Kasar	1	ret	
4	05/10/2021	Kawat Bendrat 10 kg	1	roll	
5	06/10/2021	Semen Tonasa	20	zak	
6	07/10/2021	Semen Tonasa	20	zak	Sentosa Karya
		Pasir Plester	1	ret	
		Paku Beton 1"	1	ktk	Sentosa Karya
8	09/10/2021	Semen Tonasa	20	zak	Sentosa Karya
9	11/10/2021	Pasir Cor Kasar	1	ret	Bankal Mandiri
10	12/10/2021	Semen Tonasa	20	zak	Sentosa Karya
13	15/10/2021	Semen Tonasa (20 zak)	20	zak	Sentosa Karya
		Semen Mortar (10 zak)	10	zak	Harapan
		Pasir Plester (1 ret)	1	ret	Bankal Mandiri
14	16/10/2021	Besi 6 top (50 btg)	50	btg	Harapan
		Semen Tonasa (20 zak)	20	zak	Sentosa Karya
15	18/10/2021	Kawat Bendrat 10 kg (1 roll)	1	roll	Harapan
		Semen Mortar (5 zak)	5	zak	Harapan
		Semen Mortar (10 zak)	10	zak	Dekorama
		Pasir Cor Plester(1 ret)	1	ret	Sentosa Karya
		Semen Tonasa (30 zak)	30	zak	Bankal Mandiri
16	20/10/2021	Semen Tonasa	27	zak	Sentosa Karya
		Pasir Cor Plester(1 ret)	1	ret	Bankal Mandiri
17	21/10/2021	Pasir Cor Plester(1 ret)	1	ret	Bankal Mandiri
18	22/10/2021	Semen Tonasa (30 zak)	30,00		Sentosa Karya
		Pasir Plester(1 ret)	1,00		Bankal Mandiri
19	23/10/2021	Semen Tonasa (30 zak)	30,00		Sentosa Karya
20	25/10/2021	Pasir Plester (1 ret)	1,00		CV. Fadjaya Makmur
21	26/10/2021	Semen Tonasa (30 zak)			Sentosa Karya
		Pasir Plester (1 ret)			
22	27/10/2021	Semen Tonasa (30 zak)			Sentosa Karya
24	29/10/2021	Semen Tonasa (30 zak)			Sentosa Karya
		Pasir Plester (1 ret)			CV. Fadjaya Makmur
25	30/10/2021	Semen Tonasa (30 zak)			Sentosa Karya

e. Material Delivery

The delivery process is a very important in maintaining the material sent to the project location in by following the schedule agreed in the material purchase agreement letter.

f. Material Acceptance

At this stage, the introduction will follow several procedures relating to the receipt of materials at the project location.

a. The material introduction will receive the acceptance record and then submit it back to the admissions officer.

b.Material introduction is required to report to the admissions officer for quality and quantity inspection.

g. Material Storage

For administrative orders at the storage stage, a format is needed stating that a certain amount of material has been received by the warehouse officer.

Table 4 Material Storage

Nama Tempat	Kode
Tertutup	1
Lapangan	2
Semi Tertutup	3

Nama Material	No. Material	Kode
Semen	001	1
Besi Tulangan	002	2
Bekisting	003	3
Paku	004	1
Plywood	005	1
Batu Split	006	2
Pasir	007	2
Kawat Bendrat	008	1

h. Maintaining The Level of Material Depletion

This stage should continue to be carried out throughout the project. Due to the assumption that the duration of time taken as the processing time is for a week, the system design is carried out until the stage of material production.

Table 5 Keeping Material Depleted Levels

OKTOBER					
Minggu	**Material**	**Volume**		**Satuan**	**Sisa**
		Pemasukan + Sisa	**Pengeluaran**		
1	Pasir	2	2	rit	0
	Semen	100	35	zak	65
	Bendrat	1	0	roll	1
	Batu Split	1	0	rit	1
	Paku 1 1/2"	2	0	pack	2
	Paku 2"	2	0	pack	2
2	Pasir	5	4		1
	Semen	185	100		85
	Bendrat	1	1		0
	Batu Split	1	1		0
	Paku 1 1/2"	2	1		1
	Paku 2"	2	1		1
3	Pasir	7	3		4
	Semen	312	120		192
	Bendrat	1	1		0
	Batu Split	0	0		0
	Paku 1 1/2"	4	1		3
	Paku 2"	1	0		1
4	Pasir	4	3		1
	Semen	192	192		0
	Bendrat	0	0		0
	Batu Split	0	0		0
	Paku 1 1/2"	3	2		1
	Paku 2"	1	0		1

5. CONCLUSION

Based on the results of the analysis and discussion that has been carried out for the final project research entitled Management System on Narrow Land in the Total Rehab Project of the Pemurus Baru Health Center, the conclusions of this study were obtained as follows:

1. From the calculation results of the Pareto analysis, it is known that the types of materials included in the material management system are Reinforced Iron, Formwork, and Ready Mix.
2. With good material management, it will make it easier to handle work based on procedures that have been arranged systematically.
3. With a clear and systematic management format, it will be able to minimize the occurrence of things that will cause losses on the part of the company.

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