PROJECT MANAGEMENT INFORMATION SYSTEM IN PT. NATASA MEGAH MULIA

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ABSTRACT

PT. Natasa Megah Mulia is a company engaged in develover, general contractor, supplier and heavy equipment rental. In the implementation of several projects that have been done, they often experience obstacles so that they experience delays and the absence of critical job analysis, which makes it difficult for the site manager to determine the focus of work. Project managers have difficulty evaluating project activities because there is no time and cost control and site managers have difficulty controlling risk due to the absence of risk recording. The next problem is that some employees who have been involved so far have difficulty determining the status of the progress of work done when there are employees who are not present.

Based on the existing problems, it is necessary to develop a project management information system at PT. Natasa Megah Mulia. The aim is to help implement the project in determining the focus of work with critical path method, assist the project manager in evaluating the time and cost of using the method earned value management. For risk problems that often arise in project implementation using methods probability impact matrix. For the problem of lack of communication during project execution, it is necessary to apply communication management features so that it can plan needs for each user. Based on the results of testing, it can be concluded that this system has helped scheduling by displaying critical paths to make it easier to determine the focus of work, help evaluate projects, assist in controlling risks and assist communication between stakeholders in the project.

Keywords: Project Management, Critical Path Method, Earned Value Management, Probability Impact Matrix, Communication Management

1. PRELIMINARY

PT. Natasa Megah Mulia is a company engaged in develover, general contractor, supplier and heavy equipment rental, founded in 2015 by Mr. Yon Haryono. Mr. Yon Haryono who is the managing director at PT. Natasa Megah Mulia until now, this company has built housing, buildings, repair roads and bridges several times.

Based on the results of the interview with Mr. Triyo Sanjoyo as the Head of Section. Technical and *Site Manager* at PT. Natasa Megah Mulia said that in a number of projects that have been carried out, they often experience obstacles that occur during the project so that they experience delays. This delay is caused by problems in scheduling, such as the Griya Tumaritis Housing project activities, pada pekerjaan tanah mengalami penundaan 0,32% dari berat jadwal perencanaan, yang disebabkan oleh faktor curah hujan yang tinggi, mengakibatkan *site manager* have difficulty in determining which work must be done first.

Furthermore, the obstacles that occur in scheduling have an impact on time and cost deviations, where the weight of the plan does not match the planned one that occurs at week 6 and 12, due to the lack of evaluation of time and costs, in addition the reports made so far are only in the form of plan weights and actual work weights.

From what was described above, the factors that caused the obstacles occurred because of the neglect of the risks that emerged during the project implementation and the absence of project risk recording., so *site manager* having difficulty making decisions early because they have to wait for a decision from *project manager.*

Furthermore, Mr. Triyo Sanjoyo was involved during this time having dificulty determining the status of the progress of the work carried out if there were employees who were absent, so that the work carried out did not go as expected.

Based on the problems presented, a solution is needed for the problems that occur in the implementation of the project, namely the need to implement project scheduling to determine the focus of work that can be delayed and cannot be postponed. The solution to the problem of evaluating project time and costs needs to be evaluated weekly which can identify time and cost deviations. The next solution is to address the risks that often arise in project implementation, *project manager* can identify project risks early by looking at the level of risk in each risk that arises.

For problems with lack of communication during project implementation, it is necessary to implement

communication management features so that they can plan the needs of stakeholders. So that it can reduce communication problems during project work.

1.1. Stage of Research

The stages of research carried out in the development of Project Management Information Systems at PT. Natasa Megah Mulia starts as follows:
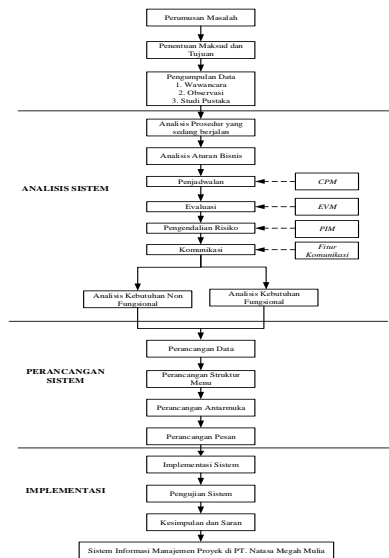

Figure 1 Stage of Research

1.2. Information Systems

Information systems are elements that are regularly interrelated with the aim of managing data to produce useful information. The information system also has several components, namely Hardware, Software, Brainware, Data and Procedures. [1]

1.3. Project management

Project Management is an application of science, skills, and expertise in the best technical way and with limited resources to achieve predetermined goals in order to obtain optimal results in terms of cost performance, quality and time and work safety.[2]

1.4. Project scheduling

Project scheduling analysis is one element of planning that provides information about the schedule of plans and the duration to complete the project.[6]

1.4.1. Metode *Critical Path Method* (CPM)

Critical Path Method (CPM) is a method of analyzing the path of activities or activities by showing the longest total time and fastest project completion time by predicting the total duration of the project time.[3]

1.5. Project Control

Control is an effort that is used to determine according to the planning goals, designing information systems, comparing implementation with standards, by analyzing the possibility of deviations between implementation and standards, then taking corrective actions needed so that resources are used effectively and efficiently in order to achieve a goal certain.[4]

1.5.1. Metode *Earned Value Management* (EVM)

The Earned Value Management (EVM) method is used for managing time and costs, by identifying the performance of all projects and work packages in it and predicting cost and time performance. [4]

1.6. Project Risk Management

According to Wideman, project risk in risk management is the cumulative effect of uncertain event opportunities that affect project goals and objectives. The aim of risk management is to minimize losses and increase opportunities. [2]

1.6.1. *Probability Impact Matrix* (PIM)

Probability Impact Matrix (PIM) is a risk approach developed using two criteria to measure risk, namely Probability and Impact.

Probability Impact Matrix is a matrix that is built by giving a level of risk (very low, low, medium, high, and very high) to the risk as measured by a combination of probability and impact scales. [5]
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Figure 2 *Boston Square Matrix*

1.7. Project Communication Management

Communication Management planning is the process of developing a project approach and an appropriate communication plan based on the needs and requirements of stakeholder information. The main benefit of this process is identifying and documenting approaches to communicate effectively and efficiently with stakeholders. [5]

1.7.1. Manage Communication

Managing communication is the process of creating, collecting, distributing, storing, retrieving, and the latest is project information in accordance with planned communication management. The main benefit of this process is enabling efficient and effective communication between project stakeholders. [5]

1.7.2. Communication Control

Control of communication is the process of monitoring and controlling overall communication to ensure that the information needs of stakeholders in

each communication agenda have been fulfilled. The benefit of this process is ensuring optimal information flow to all communication participants.[5]

2. RESEARCH CONTENT

2.1. Research Case Study

Case studies that are the subject of research are the activities of the joint Griya Tumaritis Housing development project No SPK 030/SPK/NMM/2016, where the project implementation schedule starts on September 5, 2016 s/d December 23, 2017, estimated for 62 weeks and completed with an estimated cost of Rp. 1,575,007,500.

Table 1 Detailed cost breakdown

No	Jenis Pekerjaan	Total Harga
I	Pek. Persiapan	Rp 73,750,000
II	Pek. Tanah	Rp 15,220,000
III	Pek. Pondasi	Rp 113,312,500
IV	Pek. Beton	Rp 183,125,000
V	Pek. Pasangan	Rp 560,687,500
VI	Pek. Kayu & Plafond	Rp 217,800,000
VII	Pek. Atap	Rp 130,162,500
VIII	Pek. Cat	Rp 130,700,000
IX	Pek. Instalasi Listrik	Rp 19,125,000
X	Pek. Sanitasi	Rp 71,500,000
XI	Pek. Lain-lain	Rp 59,625,000
Total		Rp 1,575,007,500

2.2. Project Scheduling Analysis

The purpose of project scheduling analysis is by using Critical Path Method (CPM) to optimize the project schedule by finding a critical path to a job. The following is a table of work activities.

Table 2 Job Activity Description

No	Jenis Pekerjaan	Durasi (Minggu)
I	Pekerjaan Persiapan	2
II	Pekerjaan Tanah	5
III	Pekerjaan Pondasi	9
IV	Pekerjaan Beton	12
V	Pekerjaan Pasangan	12
VI	Pekerjaan Kayu dan Plafond	12
VII	Pekerjaan Atap	4
VIII	Pekerjaan Cat	5
IX	Pekerjaan Instalasi Listrik	9
X	Pekerjaan Sanitasi	2
XI	Pekerjaan Lain-Lain	2

The following is a logical relationship between jobs in the Griya Tumaritis Housing development project, can be seen in table 3.

Table 3 Inter-Job Relations

No	Jenis Pekerjaan	kode	Pekerjaan Pendahulu	Pekerjaan Pengikut	Durasi (Minggu)
I	Pekerjaan Persiapan	I	-	II,III	2
II	Pekerjaan Tanah	II	I	IV	5
III	Pekerjaan Pondasi	III	I	V	9
IV	Pekerjaan Beton	IV	II	VI	12
V	Pekerjaan Pasangan	V	III	VI	12
VI	Pekerjaan Kayu dan Plafond	VI	IV,V	VII	12
VII	Pekerjaan Atap	VII	VI	VIII, IX	4
VIII	Pekerjaan Cat	VIII	VII	X	5
IX	Pekerjaan Instalasi Listrik	IX	VII	X	9
X	Pekerjaan Sanitasi	X	VII	XI	12
XI	Pekerjaan Lain-Lain	XI	SELESAI		2

Based on the table above, it will be a reference for calculations and made into the network, so that the logical relationship of a job will be clearly illustrated to get the results in the form of a critical path.

Table 4 Critical Path Calculation

Kegiatan								
I	J	Kode	Durasi	ES	EF	LS	LF	TF
0	1	I	2	0	2	0	2	0
2	2	II	5	2	7	18	23	16
1	3	III	9	2	11	2	11	0
4	4	IV	12	7	19	23	35	16
3	11	V	12	11	23	11	23	0
5	7	VI	12	23	35	23	35	0
6	7	VII	4	35	39	35	39	0
8	8	VIII	5	39	44	55	60	16
7	10	IX	9	39	48	39	48	0
9	10	X	12	48	60	48	60	0
10	11	XI	2	60	62	60	62	0

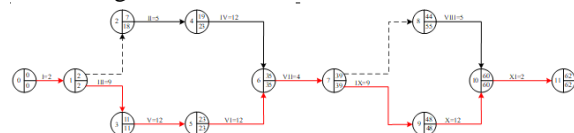For critical paths the project work network can be seen in Figure 3.

Figure 3 Critical Path Network Project Work

For critical work can be seen in table 5.

Table 5 Critical Job Project

No	Nama Pekerjaan	Kode	Status
I	Pekerjaan Persiapan	I	Kritis
II	Pekerjaan Tanah	II	Kritis
III	Pekerjaan Pondasi	III	Kritis
IV	Pekerjaan Beton	IV	Kritis
V	Pekerjaan Pasangan	V	-
VI	Pekerjaan Kayu dan Plafond	VI	-
VII	Pekerjaan Atap	VII	Kritis
VIII	Pekerjaan Cat	VIII	Kritis
IX	Pekerjaan Instalasi Listrik	IX	-
X	Pekerjaan Sanitasi	X	Kritis
XI	Pekerjaan Lain-Lain	XI	Kritis

Based on the results of scheduling analysis in the table above, it can be seen the total work time in the critical path. Critical path to work I – III – V – VI – VII – IX – X – XI is a job that cannot be postponed, if there is a delay in the work there will be a delay in the next work. Then conclusions can be drawn from the results of the analysis using *Critical Path Method* (CPM) this can help *site manager* to determine the focus of work by giving information on work that can be postponed and cannot be postponed, so that project implementation can be in accordance with the specified schedule.

2.3. Project Control Analysis
2.3.1. Job Weight Calculation

Calculation of work weight is calculated based on the price of the work unit in accordance with the contract value and does not include 10% VAT. The following is a detailed calculation of weights for each job.

Table 6 Job Weight Calculation

No	Jenis Pekerjaan	Biaya Pekerjaan		Bobot (%)
1	Pek. Persiapan	Rp	73,750,000	4.683
2	Pek. Tanah	Rp	15,220,000	0.966
3	Pek. Pondasi	Rp	113,312,500	7.194
4	Pek. Beton	Rp	183,125,000	11.627
5	Pek. Pasangan	Rp	560,687,500	35.599
6	Pek. Kayu & Plafond	Rp	217,800,000	13.829
7	Pek. Atap	Rp	130,162,500	8.264
8	Pek. Cat	Rp	130,700,000	8.298
9	Pek. Instalasi Listrik	Rp	19,125,000	1.214
10	Pek. Sanitasi	Rp	71,500,000	4.540
11	Pek. Lain-lain	Rp	59,625,000	3.786
	Total	Rp	1,575,007,500	100

2.3.2. Recap of Analysis Results

Next is the recap of analyst results can be seen in table 7.

Table 7 Recap of Analysis Results

Minggu Ke	Analisis Varians		Analisis Kinerja		Analisis Estimasi	
	Biaya CV=EV-AC (Rp.)	Jadwal SV=EV-PV (Rp.)	Biaya CPI=EV/PV	Jadwal SPI=EV/AC	Biaya Tersisa ETC (Rp.)	Biaya Penyelesaian EAC (Rp.)
1	4,500,000	-	1.139	1.000	1,538,132,500	1,570,507,500
2	4,500,000	-	1.139	1.000	1,538,132,500	1,570,507,500
3	570,000	-	1.038	1.000	1,559,373,222	1,574,437,500
4	570,000	-	1.038	1.000	1,559,373,222	1,574,437,500
5	570,000	-	1.038	1.000	1,559,373,222	1,574,437,500
6	1,530,000	-5,040,024	1.169	0.678	2,308,654,462	2,317,718,716
7	570,000	-	1.038	1.000	1,559,373,222	1,574,437,500
8	3,575,000	-	1.147	1.000	1,547,156,806	1,571,432,500
9	3,575,000	-	1.147	1.000	1,547,156,806	1,571,432,500
10	3,575,000	-	1.147	1.000	1,547,156,806	1,571,432,500
11	3,575,000	-	1.147	1.000	1,547,156,806	1,571,432,500
12	2,503,400	-23,814,113	1.07	0.616	2,495,657,397	2,531,324,259
13	5,570,000	-	1.099	1.000	1,513,023,125	1,569,437,500
14	5,570,000	-	1.099	1.000	1,513,023,125	1,569,437,500
15	5,570,000	-	1.099	1.000	1,513,023,125	1,569,437,500
16	10,610,024	5,040,024	1.188	1.081	1,394,587,515	1,451,001,890
17	4,550,000	23,814,113	1.056	1.384	1,075,866,155	1,157,114,643
18	5,570,000	-	1.099	1.000	1,513,023,125	1,569,437,500
19	5,570,000	-	1.099	1.000	1,513,023,125	1,569,437,500
20	3,000,000	-	1.069	1.000	1,528,283,542	1,572,007,500
21	3,000,000	-	1.069	1.000	1,528,283,542	1,572,007,500
22	3,000,000	-	1.069	1.000	1,528,283,542	1,572,007,500
23	3,000,000	-	1.069	1.000	1,528,283,542	1,572,007,500
24	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
25	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
26	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
27	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
28	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
29	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
30	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
31	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
32	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
33	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
34	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
35	2,300,000	-	1.145	1.000	1,556,857,500	1,572,707,500
36	4,550,000	-	1.163	1.000	1,542,466,875	1,570,457,500
37	4,550,000	-	1.163	1.000	1,542,466,875	1,570,457,500
38	4,550,000	-	1.163	1.000	1,542,466,875	1,570,457,500
39	4,550,000	-	1.163	1.000	1,542,466,875	1,570,457,500
40	3,600,000	-	1.146	1.000	1,546,742,500	1,571,407,500
41	3,600,000	-	1.146	1.000	1,546,742,500	1,571,407,500
42	3,600,000	-	1.146	1.000	1,546,742,500	1,571,407,500
43	3,600,000	-	1.146	1.000	1,546,742,500	1,571,407,500

No						
44	3,600,000	-	1.146	1.000	1,546,742,500	1,571,407,500
45	104,500	-	1.052	1.000	1,572,882,500	1,574,903,000
46	104,500	-	1.052	1.000	1,572,882,500	1,574,903,000
47	104,500	-	1.052	1.000	1,572,882,500	1,574,903,000
48	104,500	-	1.052	1.000	1,572,882,500	1,574,903,000
49	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
50	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
51	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
52	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
53	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
54	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
55	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
56	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
57	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
58	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
59	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
60	432,500	-	1.078	1.000	1,569,049,167	1,574,575,000
61	2,250,000	-	1.082	1.000	1,545,195,000	1,572,757,500
62	2,250,000	-	1.082	1.000	1,545,195,000	1,572,757,500

2.4. Project Risk Analysis
2.4.1. Risk identification

Identifikasi risiko ini dikelompokkan berdasarkan dari jenis risiko dan dengan memberikan kode risiko disetiap risikonya tersebut.

Tabel 8 Identifikasi Risiko

Kode Resiko	Jenis Resiko	Variable Resiko
R1	Personal	Tenaga kerja berhalangan hadir
R2		Tenaga kerja mengundurkan diri
R3	Estimasi	Perkiran jadwal yang tidak sesuai dengan rencana
R4		Perkiraan biaya yang tidak sesuai dengan renca anggaran
R5		Naiknya harga bahan material
R6	Alat Penunjang	Keterlambatan saat mengirim alat penunjang kerja

Kode Resiko	Jenis Resiko	Variable Resiko
R7		Rusak atau hilangnya alat penunjang pekerjaan
R8		Jalur akses pengiriman alat penunjang tidak memadai
R9	Keselamatan Kerja	Tenaga kerja terluka karena alat penunjang
R10		Tenaga kerja jatuh saap pemasangan atap
R11		Tenaga kerja tertimpa bahan material
R12	Eksternal	Terlambatnya pengiriman bahan material
R13		Terjadinya curah hujan tinggi dan bencana alam
R14		Bahan material hilan atau dicuri
R15		Terlalu lamanya saat mengurus perizinan

2.4.2. Calculation of Risk Levels of Interest

The following is a calculation of the level of risk importance that can be seen in table 9.

Table 9 Calculation of Risk Levels of Interest

Kode Resiko	Jenis Resiko	Variable Resiko	P	D	TK
R1	Personal	Tenaga kerja berhalangan hadir	3	2	6
R2		Tenaga kerja mengundurkan diri	3	3	9
R3	Estimasi	Perkiran jadwal yang tidak sesuai dengan rencana	2	3	6
R4		Perkiraan biaya yang tidak sesuai dengan renca anggaran	1	2	2
R5		Naiknya harga bahan material	1	2	2
R6	Alat Penunjang	Keterlambatan saat mengirim alat penunjang kerja	1	2	2
R7		Rusak atau hilangnya alat penunjang pekerjaan	1	3	3
R8		Jalur akses pengiriman alat penunjang tidak memadai	2	2	4
R9	Keselamatan Kerja	Tenaga kerja terluka karena alat penunjang	1	2	2
R10		Tenaga kerja jatuh saat pemasangan atap	1	4	4
R11		Tenaga kerja tertimpa bahan material	1	4	4
R12	Eksternal	Terlambatnya pengiriman bahan baku	2	3	6
R13		Terjadinya curah hujan tinggi dan bencana alam	3	5	15
R14		Bahan material hilang atau dicuri	1	4	4
R15		Terlalu lamanya saat mengurus perizinan	2	2	4

2.4.3. Calculation of Risk Levels of Interest

The following control measures for each risk can be seen in table 11.

Table 11 Risk Management

Kode Resiko	Jenis Resiko	Tingkat Resiko	Pengendalian Resiko
R1	Personal	Sedang	Melakukan negoisasi dengan memanfaatkan SDM yang ada dengan menambah jam kerja dan lakukan komunikasi dengan tim proyek untuk mengefektifkan kinerja proyek
R2		Sedang	Memanfaatkan SDM yang tersedia dengan memberikan tugas tambahan dan penambahan jam kerja.
R3	Estimasi	Sedang	Menambah jam kerja SDM yang menangani proyek dan melakukan percepatan pekerjaan dengan koordinasi tim proyek mengenai pemahaman tindak lanjut kinerja proyek.
R4		Rendah	Maintenance biaya dengan melakukan Pengurangan jumlah biaya yang kurang diperlukan.
R5		Rendah	Selalu mengecek atau menanyakan kepada pihak supplier jika ada kenaikan bahan.
R6		Rendah	Melakukan koordinasi dengan bag.oprasional untuk menindak lanjuti kepada pihak terkait.
'R7	Alat Penunjang	Rendah	Dengan meningkatkan kehati-hatian saat melakukan pekerjaan dan meningkatkan pengawasan.
R8		Rendah	Mencari jalan alternatif agar alat berat tetap mendapat akses, jika tetap tidak memadai segera lakukan komunikasi kepada tim proyek untuk mencari alternatif alat berat lain.
R9	Keselamatan Kerja	Rendah	Memberi pengarahan kepada pekerja agar mengutamakan keselamatan kerja.
R10		Rendah	Memberi pengarahan kepada pekerja agar mengutamakan keselamatan kerja.
R11		Rendah	Memberi pengarahan kepada pekerja agar mengutamakan keselamatan kerja.
R12	Eksternal	Sedang	Melakukan negoisasi terus dan melakukan komunikasi dengan pihak supplier untuk segera melakukan tindak lanjut dan jalan keluar pengiriman material.
R13		Tinggi	Kinerja proyek harus tetap berjalan dengan syarat kondisi sekitar memungkinkan dan tetap mengutamakan keselamatan pekerja.
R14		Rendah	Melakukan komunikasi dengan keamanan terkait untuk menginstruksikan bagian keamanan secara bergantian menjaga lingkungn sekitar proyek.
R15		Rendah	Bag.administrasi harus sering berkoordinasi dengan bagian terkait tentang masalah perizinan.

2.5. Communication Management
2.5.1. Communication Design Management

Management Communication planning is a development process for carrying out a project communication plan that is appropriate based on stakeholder needs.

Table 10 Communication Design

Jenis Pertemuan	Agenda	Waktu	Penanggung Jawab	Partisipan	Masukan	Hasil
Perencaan Jobdesk dan RAB	- Menentukan jobdesk pekerjaan dan bagian terkait - Menentukan pekerjaan dan estimasi biaya	04/08/2016	Project Manajer	Site manager, bag. Operasional, Bag, Administrasi	- Menentukan jobdesk - Membuat struktur organisasi proyek - Membuat item pekerjaan berdasarkan rincian terhadap volume pekerjaan dan biaya	- Struktur Organisasi Proyek - Laporan RAB
Perencaan Jadwal Pelaksaan	Menentukan jangka waktu pelaksanaan	09/08/2016	Project Manajer	Site manager, bag. Operasional, Bag, Administrasi	Membuat rencana jadwal pekerjaan berdasarkan jangka waktu per pekerjaan dan bobot pekerjan	Jadwal Pekerjaan Proyek
Evaluasi Progres Pekerjaan	Memantau kesesuaian anggaran biaya dengan pekerjaan dilapangan	15/10/2016	Project Manajer	Site manager, bag. Operasional, Bag, Administrasi	Membuat Laporan progress proyek	Laporan Kemajuan Proyek
Penutupan proyek	Memantau semua pekerjaan	09/01/2017	Project Manajer	Site manager, bag. Operasional, Bag, Administrasi	Membuat laporan penutupan proyek yang telah selesai dikerjakan	Laporan Penutupan Proyek

2.5.2. Manage Communication

Managing communication is a process of creating, collecting, distributing, storing, retrieving, and finally the project information as planned.

Table 11 Manage Communication

Jenis Pelaporan	Item	Waktu	Penanggung jawab	Partisipan	Masukan	Hasil	Status	Format
Laporan RAB dan Struktur Organisasi Proyek	-Rencana Anggaran Biaya -Harga satuan dan volume pekerjaan - Struktur Organisasi proyek	02/08/2016	Project Manager	Project manager, Site Manager, Bag. Administrasi	- Membuat item pekerjaan berdasarkan rincian terhadap volume pekerjaan dan biaya - Struktur Organisasi Proyek	- Laporan RAB - Struktur Organisasi Proyek	Selesai	Soft Copy dan Hard Copy
Jadwal pekerjaan proyek	-Urutan jenis pekerjaan proyek -Bobot pekerjaan pada setiap item pekerjaan	09/08/2016	Project Manager	Project manager, Site Manager, Bag. Administrasi	Membuat rencana jadwal pekerjaan berdasarkan jangka waktu per item pekerjaan dan bobot pekerjaan	Jadwal pekerjaan proyek	Selesai	Softcopy
Laporan progress	-Item pekerjaan yang sudah dikerjakan beserta bobot -Tenaga kerja yang terlibat -Pengadaan alat dan material	15/10/2016	Project Manager	Project manager, Site Manager, Bag. Administrasi	Membuat laporan progress proyek.	Laporan progress proyek	Selesai	Hard copy
Laporan Penutupan proyek	-laporan progress perminggu -serah terima proyek	09/01/2017	Project Manager	Project manager, Site Manager, Bag. Administrasi	Membuat laporan penutupan proyek yang menunjukkan pekerjaan telah selesai dikerjakan	Laporan Penutupan proyek	Proses	Soft copy

2.6. Functional Needs Analysis
2.6.1. *Use Case Diagram*

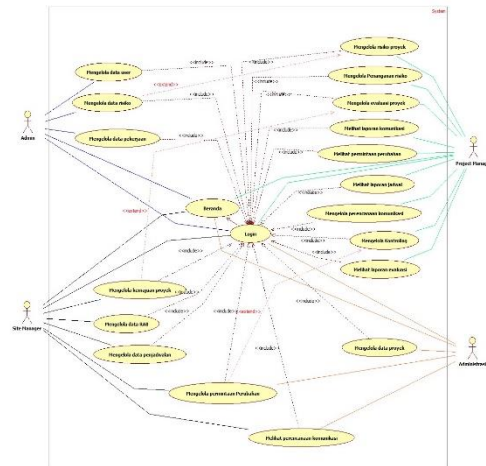Use case diagram analysis can be seen in Figure 4.

Figure 4 *Use Case Diagram*

2.6.2 *Class Diagram*

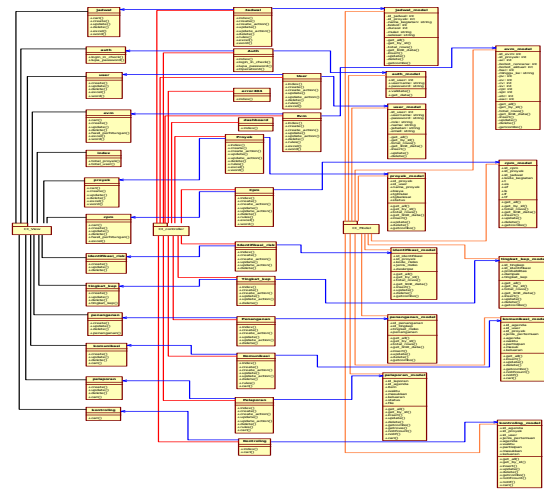C*lass diagram* dapat dilihat pada gambar 5.

Figure 5 *Class Diagram*

2.7. Data Design
2.7.1. Relationship Scheme
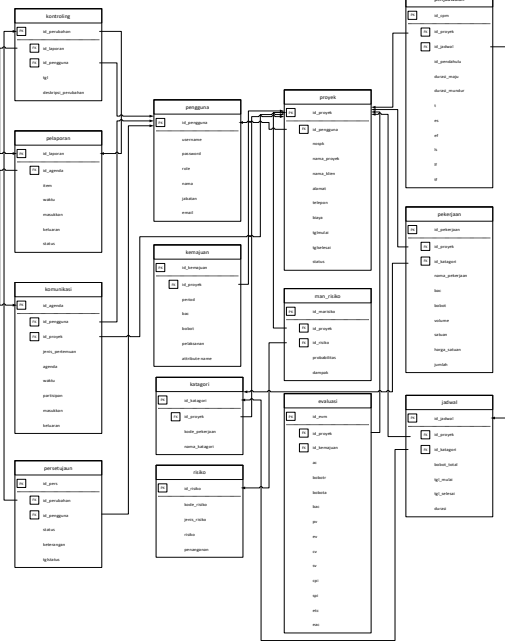The relation scheme can be seen in Figure 6

Figure 6 Relationship Scheme

2.8. Interface Design
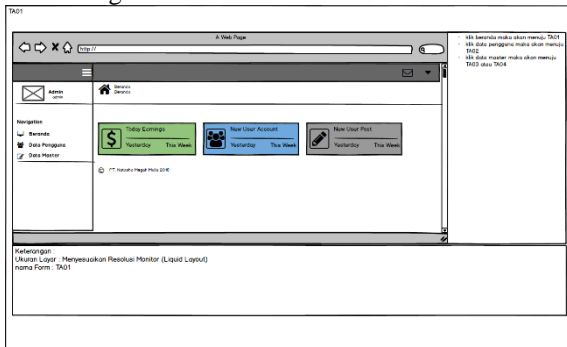The design of the Admin home interface can be seen in Figure 8.

Figure 7 Mouckup *Admin*

The design of the Administration home interface can be seen in Figure 9.

Figure 8 Mouckup Administrasi

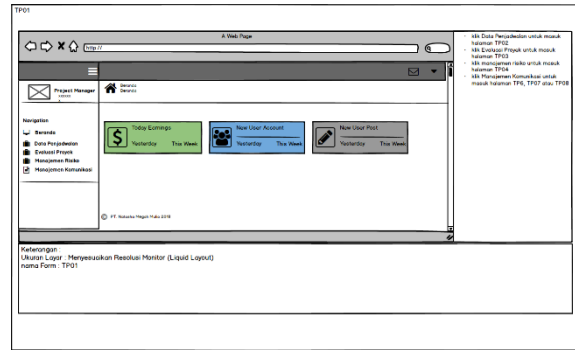The design of the Project Manager home interface can be seen in Figure 10.

Figure 10 Mouckup *Project Manager*

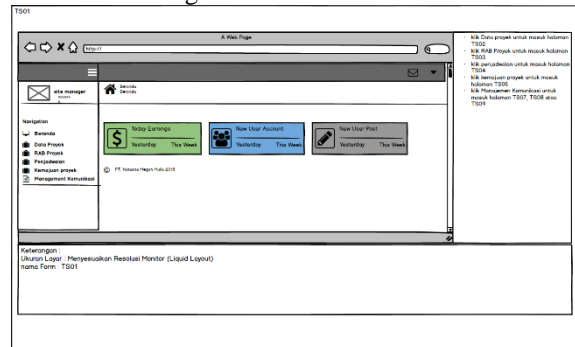Designing the Site Manager homepage interface can be seen in figure 11..

Figure 11 Mouckup *Site Manager*

2.9. Testing Conclusions
2.9.1. Blackbox Testing Conclusions
Based on the results of testing the black box system that has been carried out as a whole, it can be concluded that the processes that occur in the project management information system at PT. Natasa Megah Mulia is right and as expected. Showing error messages, warnings are quite maximal and functionally the system built can produce the expected output.

2.9.2. Kesimpulan Pengujian Beta
Based on the results of beta testing, it can be concluded that the project management information system at PT. Natasa Megah Mulia is in accordance with the expected goals.
a. An integrated project management information system can help monitor scheduling, manage evaluation data with recommendations on costs and times of the week, control risks, and control communication between related parts.
b. Sistem informasi manajemen proyek yang telah dibangun dapat membantu mengelola data RAB proyek, membuat penjadwalan, membuat laporan kemajuan proyek, dan memfasilitasi komunikasi antara bagian-bagian terkait.
c. The project management information system that was built has helped the administration section to manage data projects and facilitate communication between related parts.

d. The project management information system built has been able to help admin manage user data, create risk master data and jobs.

3. CLOSING

Based on the results obtained in the final project research that has been done, it can be concluded that:

The project management information system that has been built can help the site manager determine the focus of work by providing information on jobs that can be delayed and cannot be delayed.

a. The project management information system that has been built can help project managers to evaluate project costs and times by recommending ETC and EAC values which will be a reference for project managers to control time and costs.

b. The project management information system that has been built can help project managers in controlling risk by preparing handling to be carried out from risk identification in accordance with the level of risk and the effects of risk which can be a reference for risk control.

c. The project management information system that has been built can help project managers, location managers and administrations reduce misscommunication problems between stakeholders, so that things that are not met by stakeholders can be immediately communicated well and the project manager can make solutions early to avoid deep problems communication.

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