# *PROJECT MANAGEMENT INFORMATION SYSTEM AT CV. MUKTI JAYA*

*Firmansyah[1], Gentisya Tri Mardiani[2]*

*[1,2] Teknik Informatika – Universitas Komputer Indonesia*
*Jl. Dipatiukur 112-116, Bandung 40132, Indonesia*
*E-mail : firmansyah50@outlook.com[1], gentisya.tri.mardiani@email.unikom.ac.id[2]*

## *ABSTRACT*

*CV. Mukti Jaya is one of the companies engaged in the field of construction services. From several previous tenants there are problems that are caused by several factors, including the absence of a job schedule baku, the absence of a system that can help the technical person in charge to oversee the work of the project, to have not the existence of good risk management.*

*Based on existing problems, then it takes a project management information system to handle the schedule of project planning, cost control and time, and risk management. The method of Critical Path Method (CPM) is used for the planning schedule. Method of Earned Value Management (EVM) is used for time and project cost control. While using the method to manage risk Probability Impact Matrix (PIM) and Earn Value Management method (EMV).*

*Based on the results of the interviews and testing, systems that are made are enough help Technical Responsible in making the plan of the project schedule, oversaw the project whether or not according to plan both in terms of cost as well as time and identify risks with project costs before the project was implemented.*

***Keyword :*** *Project Management, Information System, Critical Path Method, Earned Value Management, Probability Impact Matrix, Expected Monetary Value.*

## *1. INTRODUCTION*

*CV. Mukti Jaya is one of the companies engaged in the field of construction services are located at Kampung Kertamukti village of Cikelet Subdistrict Cibitung Garut. The company established since 4 November 2013 is in one year could get 3 to 6 projects. Projects handled include road construction, road rehabilitation, road reinforcement, construction of the bridge, as well as other construction projects. This company is a construction company that is still developing so that the projects undertaken is the result of direct appointment from the Office of the Government without going through the tender.*

*Based on the results of the interview with Mr. Iya Sukarya as technical responsibility penangung CV. Mukti Jaya, the problems that occur in the implementation of the project on the CV. Mukti Jaya was caused by several factors, namely often mismatch between project plans with pelaksanaanya, due to the absence of a work schedule of baku. It poses less full framework in the planning of the project, so the dependence between jobs not reflected clearly and makes the company must perform the addition of schedules of work and have to pay an additional fee. The company has also worked on projects that are carried out in the same time, the location of the bejauhan between a project with other projects made in charge of the technical difficulties of such a project to keep an eye, because the technical person in charge have to commute from one place to other projects.*

*In addition the technical person in charge of CV. Mukti Jaya also convey the obstacles the obstacles that occur when work projects such as delivery delays because the materials problem occurs when delivery such as leakage of ban or strike. This company should be manambah expenses. Costs incurred are sometimes not counted properly. This of course being the losses for the company, because it has not been the existence of costs provided to deal with these obstacles. These risks often appear when in the process of project work, certainly it hamper the work of the project. So the need for risk management can help technically in charge of calculating the costs to the risk in order to produce a better project management for the company.*

*Based on these issues, that needed a solution to address the problems that often occur in the work of the project in CV. Mukti Jaya namely the need for a system which can help in making the technical person in charge of the project schedule with the clarify work that can be delayed and should not be postponed. The system to be built will be made online in order to facilitate the technical person in charge to oversee projects that sometimes can not be done directly at the location of the project. Then, in the system will be in charge of the technical help to calculate the costs incurred for risks – risks that occur.*

## 2. CONTENT OF RESEARCH

### 2.1 Research Methodology

*Research methodology used in this research is descriptive research methodology.*

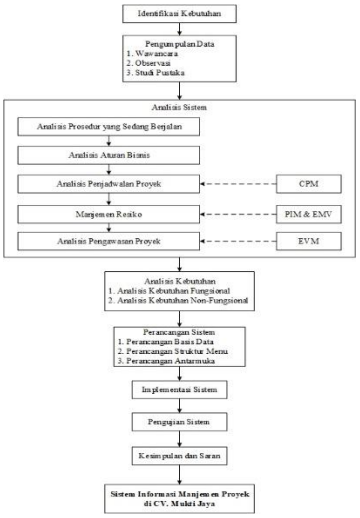



***Figure 1 research methodology***

### 2.2 Schedule Analysis

*Scheduling is one of the elements of the planning results can provide information about the schedule of the plan and the progress of the project in terms of performance resources as well as the duration of the project and the progress of time for completion of the project. In this study the scheduling method using Critical Path Method (CPM).*

### 2.2.1 Critical Path method Analysis

*Critical Path Method (CPM) or known by critical path, that path has a series of components – component of the activity, with the total amount of time the oldest and shows the completion of the project terceapat. Thus, the critical path consists of a set of critical activities, starting from the first to the last project activities. [1]*

***Table 1 activities of the road construction project Lingungan Kp Cihangawelas.***

| No | Pekerjaan | Kode | Pendahulu | Waktu |
|---|---|---|---|---|
| 0 | Mulai | - | - | 0 hari |
| 1 | Pas. Papan Bowplank Propil | 1.1 | Mulai | 2 hari |
| 2 | Bongkaran dan Pembersihan Lokasi | 1.2 | 1.1 | 4 hari |
| 3 | Pek. Galian Tanah | 2.1.1 | 1.2 | 3 hari |
| 4 | Pek. Urugan Pasir Urug | 2.1.2 | 2.1.1 | 1 hari |
| 5 | Pek. Beton Mutu fc 9.8 Mpa K-125 | 2.1.3 | 2.1.2 | 7 hari |
| 6 | Pek. Pas. Lantai Paving Block Natural 6cm(manual) | 2.1.4 | 2.1.3 | 10 hari |
| 7 | Pek. Galian Tanah (kontruksi) | 2.2.1 | 2.1.4 | 1 hari |
| 8 | Pek. Buangan Sisa Galian | 2.2.2 | 2.1.4 | 1 hari |
| 9 | Pek. Urug Tanah Kembali | 2.2.3 | 2.2.1, 2.2.2 | 1 hari |
| 10 | Pek. Pas. Batu Kali | 2.2.4 | 2.2.3 | 7 hari |
| 11 | Pek. Siaran Batu Muka | 2.2.5 | 2.2.3 | 4 hari |
| 12 | Pek. Plesteran | 2.2.6 | 2.2.4, 2.2.5 | 2 hari |
| 13 | Acian | 2.2.7 | 2.2.6 | 1 hari |

*Based on a series of activities in Environmental road construction project Kp. Cihangawelas on table 1 then produced a diagram of the network work like in Figure 1 netword diagram*

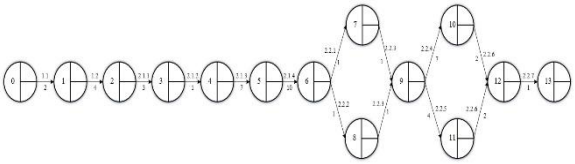


***Figure 2 Network Diagram***

*The calculation to determine the time of completion in the CPM method consists of two phases, namely calculation of forward and backward calculation.*

*Following the results of the calculation of cpm on the recap table 2 recap CPM analysis.*

***Table 2 Recap Analysis CPM***

| No | Pekerjaan | | Durasi (hari) | Paling Awal | | Paling Akhir | |
|---|---|---|---|---|---|---|---|
| | i-node | j-node | | LS | LF | ES | EF |
| 1 | 0 | 1 | 2 | 0 | 2 | 0 | 2 |
| 2 | 1 | 2 | 4 | 2 | 6 | 2 | 6 |
| 3 | 2 | 3 | 3 | 6 | 9 | 6 | 9 |
| 4 | 3 | 4 | 1 | 9 | 10 | 9 | 10 |
| 5 | 4 | 5 | 7 | 10 | 17 | 10 | 17 |
| 6 | 5 | 6 | 10 | 17 | 27 | 17 | 27 |
| 7 | 6 | 7 | 1 | 27 | 28 | 27 | 28 |
| 8 | 6 | 8 | 1 | 27 | 28 | 27 | 28 |
| 9 | 7 | 9 | 1 | 28 | 29 | 28 | 29 |
| 10 | 8 | 9 | 1 | 28 | 29 | 28 | 29 |
| 11 | 9 | 10 | 7 | 29 | 36 | 29 | 36 |
| 12 | 9 | 11 | 4 | 29 | 33 | 32 | 36 |
| 13 | 10 | 12 | 2 | 36 | 38 | 36 | 38 |
| 14 | 11 | 12 | 2 | 33 | 35 | 36 | 38 |
| 15 | 12 | 13 | 1 | 38 | 39 | 38 | 39 |

*Based on table 2 recap analysis CPM, it can work anywhere that is known to include critical path or a job that cannot be postponed because if delayed. Recapitulation of the table note that jobs that exist, is the work as a whole is on the critical path unless the job 2.2.2 and 2.2.5., forming networks of Critical Path Method as shown in the figure 3 CPM analysis results.*

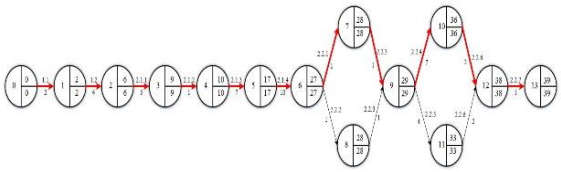


***Figure 3 results of analysis of CPM***

### *2.3 Project Supervision Analysis*

*Analysis of project supervision information showing how the progress of project cost and time. This indicator controls the position and inform the project progress within a certain period during the project progress using Earn Value Management (EVM).*

### *2.3.1 Earn Value Management (EVM) Analysis*

*Earn Value Management (EVM) is a methodology that integrates the scope, schedule, and cost data to produce a performance to be achieved, this of course helps project teams in measuring the performance and progress of the project as a whole. [2]*

*Calculation of EVM using weights planning then use actual weights are taken from the realization of the work that is done then the actual weights are calculated, and the actual costs incurred during the realization of the work – the work.*

*As for the actual planning, weights the weights along with the actual costs that occur during the project progress can be seen in tables 3 and 4.*

***Table 3 weekly plan***

| Uraian Pekerjaan | Bobot (%) | Pengerjaan (%) / Minggu | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| Pas. Bouplank/propil | 1,16 | 1,16 | | | |
| Pem. Lokasi/Bongkaran | 1,68 | 1,16 | | | |
| Pek Galian Tanah | 0,69 | | 0,69 | | |
| Pek Urugan Pasir Urug | 2,57 | | 2,57 | | |
| Pek. Beton Mutu fc 9.8 Mpa K-125 | 14,82 | | 0,74 | 14,08 | |
| Pek. Pas. Lantai Paving Blok | 40,65 | | | 9,92 | 28,00 |
| Pek. Galian Tanah | 0,63 | | | | |
| Pek Urugan Tanah Kembali | 0,06 | | | | |
| Pek. Buangan Sisa Galian | 0,25 | | | | |
| Pek. Pas. Batu Kali | 31,01 | | | | |
| Pek. Siaran Batu Muka | 3,10 | | | | |
| Pek. Plesteran | 2,38 | | | | |
| Pek. Acian | 1,00 | | | | |
| **Bobot Rencana (PV%)** | | **2,84** | **4,00** | **24,00** | **28,00** |
| **Bobot Rencana Kumulatif (PV%)** | | **2,84** | **6,84** | **30,84** | **58,84** |

***Table 4 reports the workmanship***

| Uraian Pekerjaan | | Pengerjaan (%) / Minggu |
|---|---|---|
| | Bobot (%) | 1 | 2 | 3 | 4 |
| Pas. Bouplank/propil | 1,16 | 1,16 | | | |
| Pem. Lokasi/Bongkaran | 1,68 | 1,68 | | | |
| Pek Galian Tanah | 0,69 | 0,69 | | | |
| Pek Urugan Pasir Urug | 2,57 | 2,57 | | | |
| Pek. Beton Mutu fc 9.8 Mpa K-125 | 14,82 | 5,20 | 9,62 | | |
| Pek. Pas. Lantai Paving Blok | 40,65 | 3,20 | 15,15 | 2,33 | |
| Pek. Galian Tanah | 0,63 | | | 0,63 | |
| Pek Urugan Tanah Kembali | 0,06 | | | 0,06 | |
| Pek. Buangan Sisa Galian | 0,25 | | | 0,25 | |
| Pek. Pas. Batu Kali | 31,01 | | | 10,5 | 20,9 |
| Pek. Siaran Batu Muka | 3,10 | | | 0,05 | 3,05 |
| Pek. Plesteran | 2,38 | | | | 2,38 |
| Pek. Acian | 1,00 | | | | 1,00 |
| **Bobot Aktual (AC%)** | | 14,5 | 24,77 | 33,34 | 27,39 |
| **Bobot Aktual Kumulatif (AC%)** | | 14,5 | 39,27 | 72,6 | 100 |

*From tables 5 and 6 and obtained some of the variables that must be counted in EVM namely planned value (PV), earned value (EV), schedule a Variant (SV), cost variance (CV), schedule performance index (SPI), cost performance index (CPI), estimate the actual cost (EAC) and the estimate time to complete (ETC).*

*Following are the results of the analysis methods of recap Earn Value Management (EVM) as shown in table 5 Recap Analysis EVM.*

***Table 5 Recap Analysis EVM***

| Minggu ke - | Analisa Varian | | Analisa Indeks Kerja | | Analisa Estimasi | |
|---|---|---|---|---|---|---|
| | SV | CV | SPI | CPI | ETC | EAC |
| 1 | 21.329.171,6 | 0 | 5.11 | 1 | 9 | 182.926.000 |
| 2 | 59.322.901,8 | 0 | 5.74 | 1 | 8 | 182.926.000 |
| 3 | 76.408.190,2 | 0 | 2.35 | 1 | 10 | 182.926.000 |
| 4 | 77.030.138,6 | 0 | 1.7 | 1 | 27 | 182.926.000 |

*From the results of the analysis of the results of the analysis on the calculation of the recap to 4 weeks can be taken on conclusion of the project goes according to plan because the value of the estimated time of completion (ETC) is 27 days, faster than the duration of the project that is 45 days and the cost is Rp 182,926,000.00, equal to the total budget (BAC) Rp 182,926,000.00, a value of 1 indicates > spi project acceleration compared to the planned schedule, the value of the cpi = 1 indicates the cost equal to the cost that is planned.*

*Thus, it can be concluded from the results of the working environment of the road project Kp. Cihangawelas is well underway and sooner than planned. In the schedule the project plan will be implemented within a period of 7 weeks or 45 calendar days, but in its execution of the project can be completed within 4 weeks or 27 calendar days. Although the project faster, but there is no swelling costs at the Organization.*

### *2.4 Project Risk Management Analysis*

*Project risk management is a very important activity to do when going to work on a project.. The following are the stages for identifying risks and responses using the method of Probability Impact Matrix (PIM) and to calculate the cost of the risk of using Expected Monetary Value (EMV).*

#### *2.4.1 Risk Identification*

*The identification of risks, namely how to make a list of risks that are common when the project. This identification process is done using interviews with the person in charge of technical experience, he worked on projects in perushaaan. The results of the analysis of the identification of the risks has been done can be seen in table 6 risk identification.*

***Table 6 Risk Identification***

| Kode Risiko | Jenis Risiko | Deskripsi Risiko |
|---|---|---|
| R1 | Estimasi | Jadwal tidak sesuai dengan rencana |
| R2 | | Biaya tidak sesuai dengan rencana |
| R3 | Personal | Ada pekerja lapangan yang sakit sehingga mempengaruhi jadwal proyek |
| R4 | | Kemampuan SDM yang kurang atau tidak sesuai dengan yang diharapkan |
| R5 | Alat Penunjang Konstruksi | Peralatan rusak |
| R6 | | Peralatan hilang karena dicuri |
| R7 | Eksternal | Keterlambatan pengiriman barang |
| R8 | | Hilangnya bahan baku proyek |
| R9 | | Terjadinya hujan / bencana alam |
| R10 | Keselamatan Kerjan | Kecelakaan kerja |

#### *2.4.2 Determinate the possibility and impact*

*After all the risks identified are then conducted the assessment process against the respective risks to know the category of each risk by using the Boston Square Matrix which can be seen in table 7.[3]*

***Table 7 Boston Square Matrix***

| *Probability Factor* | | | | | | |
|---|---|---|---|---|---|---|
| | *Very Likely* | 5 | 10 | 13 | 20 | 25 |
| | *Likely* | 4 | 8 | 12 | 16 | 20 |
| | *Possible* | 3 | 6 | 9 | 12 | 15 |
| | *Unlikely* | 2 | 4 | 6 | 8 | 10 |
| | *Very Unlikely* | 1 | 2 | 3 | 4 | 5 |
| | | *Slight* | *Minor* | *Significant* | *Severe* | *Major* |
| | | *Impact Factor* | | | | |

*Based on the table, the assessment of the risks and opportunities of any impact that ditimbulakn made in one scale i.e. 1 to 25 where the scale of the stated levels of high, medium and low can be seen in table 8.[3]*

***Table 8 Scale Higher Risk***

| No | Skala | Tingkat Resiko |
|---|---|---|
| 1 | 1 -5 | Rendah |
| 2 | 6 – 14 | Sedang |
| 3 | 15 – 25 | Tinggi |

*Further based on the boston matrix table table measurements produced a possibility (probability) and impact assessment criteria (impact factor) and that can be seen in tables 9 and 10[3]*

***Table 9 the measurement Possibilities***

| No | Penilaian | Nilai | Kemungkinan |
|---|---|---|---|
| 1 | Sangat Rendah (*very unlikely*) | 1 | Jarang Terjadi |
| 2 | Rendah (*unlikely*) | 2 | Kadang terjadi pada kondisi tertentu |
| 3 | Sedang (*possible*) | 3 | Dapat terjadi pada kondisi tertentu |
| 4 | Tinggi (*likely*) | 4 | Terjadi pada kondisi tertentu |
| 5 | Sangat Tinggi (*very likely*) | 5 | Sering terjadi pada kondisi tertentu |

***Table 10 impact assessment Criteria***

| No | Penilaian | Nilai | Kemungkinan |
|---|---|---|---|
| 1 | Sangat Rendah (*very unlikely*) | 1 | Dampak tidak signifikan dirasakan, kerugian keuangan dapat diabaikan |
| 2 | Rendah (*unlikely*) | 2 | Perlu penanganan langsung di tempat, kerugian keuangan menjadi biaya tambahan |
| 3 | Sedang (*possible*) | 3 | Peru ditangani oleh pelaksana teknis, kerugian keuangan cukup berarti |
| 4 | Tinggi (*likely*) | 4 | Adanya keterlambatan dari jadwal yang direncanakan |
| 5 | Sangat Tinggi (*very likely*) | 5 | Perlu penanganan khusus oleh pimpinan proyek, kerugian besar bahkan bisa gagal |

#### *2.4.3 Probability Impact Matrix (PIM) Analysis*

*Probability Impact Matrix (PIM) is an approach developed using two criteria that are important to measure risk [3], namely:*

*1. Possibility (Probability), is the possibility (Probability) of an unwanted incident.*

*2. Impact (Impact), is the level of influence or the size of the impact (Impact) on the activities of the other, if the unwanted event occur.*

*Further identification was done regarding the probability of occurrence of risks and their impacts may be incurred if the risk occurs. These values are determined based on the interview with the technical person in charge of the company. then do the calculations to find out the importance of the use of risk Probability Impact Matrix (PIM). The importance of a risk is calculated using the formula.*

*Risk Exprosure = Probability * Loss*

***Formula 1 PIM***

*Where:*
*Risk exprosure : The importance of a risk*
*Probability : The likely value of risk*
*Loss : Risk impact rating*

*The following calculation results looking for the importance of a risk on the interest risk Value 11 tebel.*

***Table 11 analysis of PIM***

| Kode risiko | Kemungkinan | Dampak | Tingkat Kepentingan | Tingkat Risiko |
|---|---|---|---|---|
| R1 | 4 | 4 | 16 | Tinggi |
| R2 | 4 | 5 | 20 | Tinggi |
| R3 | 3 | 3 | 9 | Sedang |
| R4 | 2 | 1 | 2 | Rendah |
| R5 | 2 | 3 | 6 | Sedang |
| R6 | 1 | 2 | 2 | Rendah |
| R7 | 3 | 3 | 9 | Sedang |
| R8 | 1 | 2 | 2 | Rendah |
| R9 | 2 | 3 | 5 | Rendah |
| R10 | 1 | 2 | 2 | Rendah |

*Next up is done handling the risk of action. The Act of handling the risk derived from the results of the discussion with the person in charge of CV. MUKTI JAYA. Action handling to each risk can be seen in table 12 Handling Risks.*

***Table 12 Handling Risks***

| Kode risiko | Tingkat risiko | Penanganan risiko |
|---|---|---|
| R1 | Tinggi | Memanfaatkan SDM yang ada dengan menambah jam kerja dan pemahaman tentang proyek yang dikerjakan |
| R2 | Tinggi | Memanfaatkan SDM yang ada dengan menambah jam kerja dan mengurangi biaya yang kurang diperlukan |
| R3 | Sedang | Memanfaatkan SDM yang ada, seperti menambah jam kerja atau mandor ikut menggantikan tugas pegawai |
| R4 | Rendah | Memanfaatkan SDM yang ada dengan menambah jam kerja dan segera mencari pegawai yang baru dari kolega perusahaan |
| R5 | Sedang | Segera mencari alat penunjang proyek yang baru seperti menyewa ke perusahaan rental alat berat/konstruksi |
| R6 | Rendah | Segera mencari alat penunjang proyek yang baru seperti menyewa ke perusahaan rental alat berat/konstruksi |
| R7 | Sedang | Komuikasi dengan supplier barang dan membuat perjanjian jika terjadi keterlambatan barang, supplier bersedia mencari kebutuhan barang proyek dari pihak lain |
| R8 | Rendah | Menyewa keamanan atau menitipkan kepada warga sekitar yang dapat dipercaya |
| R9 | Rendah | Bila memungkinkan proyek dikerjakana sesuai jadwal atau mencari kondisi cuaca yang baik, seperti jika selalu hujan disiang hari maka kerjakan dimalam hari |
| R10 | Rendah | Pekerja menggunakan alat pengaman pekerjaan seperti safety helmet, sarung tangan, dll. |

### *2.4.4 Expected Monetary Value (EMV) Analysis*

*Methods Earn Monetary Value (EMV) is a method of analysis that calculates the average statistical concept – average expenditure in the future that may happen or not happen. The value of EMV positive value indicates the opportunities, while negative EMV showed the threat or threats which may be detrimental to the company. EMV is calculated by multiplying the value of the probability of how each risk multiplied by the likelihood of money spent when the risk occurs. [2]*

*At this stage it will count on the extent of the costs that must be incurred to handle those risks by using the method of Expected Monetary Value (EMV). The granting of the value of the consequences and the probability of each risk is taken based on the results of the discussion with the technical person in charge of the company, the value of the consequences and the probability of this is an approximate number tebanyak must be issued for each risk. Then in the hiutng with EMV formula.*

EMV = Probailitas * Konsekuensi

***Formula 2 EMV***

*Where :*
*EMV : Expected Monetary Value*
*Probability : The frequency of occurrence of risks*
*Consequence : Fee or other compensation must be issued*

*Following are the results of the risk assessment on the table 13 analysis of EMV.*

***Table 13 Analysis of EMV***

| Kode risiko | Probabilitas (%) | Knsekuensi (Rp) | EMV (Rp) |
|---|---|---|---|
| R1 | 50 | 5.000.000 | 2.500.000 |
| R2 | 50 | 5.000.000 | 2.500.000 |
| R3 | 25 | 2.500.000 | 625.000 |
| R4 | 10 | 1.000.000 | 100.000 |
| R5 | 5 | 1.800.00 | 900.000 |
| R6 | 5 | 1.000.000 | 50.000 |
| R7 | 30 | 2.100.000 | 630.000 |
| R8 | 5 | 1.000.000 | 50.000 |
| R9 | 15 | 1.500.000 | 225.000 |
| R10 | 11 | 1.500.000 | 165.000 |

*Based on the table 13 known how large the value of threat of each risk. So, companies have to spend as much money as the figure if one of those risks occur during the work of the project. The cost that is used to handle the risks derived from the cost of the reserves of the company. So the company should allocate funds to handle the risk if one occurs.*

### *2.5 Analysis of User Needs*

*Analysis of the user (user) is required to support the project management system will be built in accordance with the needs of the system. Analysis of present users with required are as follows in table 14.*

***Table 14 the user needs***

| No | Pengguna | Hak Akses | Tingkat Keterampilan |
|---|---|---|---|
| 1 | Penanggung Jawab Teknis | 1. Membuat data klien<br>2. Membuat data proyek<br>3. Membuat jadwal<br>4. Mengelola resiko<br>5. Mengawasi proyek<br>6. Melihat laporan proyek | Memahami pemakaian computer dan aplikasi berbasis web |
| 2 | Pelaksana Teknis | 1. Membuat laporan<br>2. Melihat data proyek<br>3. Melihat data jadwal | Memahami pemakaian computer dan aplikasi berbasis web |

### *2.6 Database Analysis*

*Database analysis is the analysis phase to describe the desired system in the form of the relationships between the entities involved in information systems project management CV. MUKTI JAYA. The following figure 4 SIM Project ERD CV MUKTI JAYA 15 table data Dictionary along with the ERD*

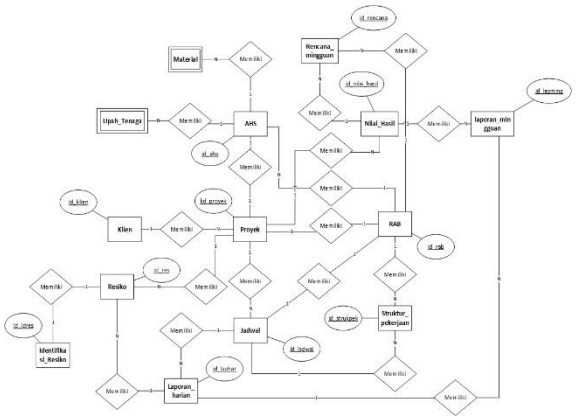



***Figure 4 the SIM Project ERD CV MUKTI JAYA***

***Table 15 data Dictionary ERD***

| No | Entitas | Atribut |
|---|---|---|
| 1 | Proyek | {Id_proyek, nama_proyek, nama_klien, nilai_kontrak, tanggal_kontrak, tanggal_mulai, tanggal_selesai, status_proyek, deskripsi} |
| 2 | Klien | {id_klien, nama_klien, alamat, no_telp} |
| 3 | Jadwal | {id_jadwal, nama_pekerjaan, tanggal_mulai, tanggal_selesai, durasi, pendahulu, es, ef, lf, ls, tf} |
| 4 | Nilai_hasil | {id_nilaihasil, nilai_kontrak, minggu_ke, bobot_rencana, bobot_aktual, durasi, pv, ev, cv, sv, cpi, spi, eac,etc} |
| 5 | AHS | {id_ahs, nama_analisa, satuan, keterangan, total} |
| 6 | Identifikasi_risiko | {id_idres, nama_risiko, probabilitas, konsekuensi, ting_risiko,penanganan} |
| 7 | Laporan_harian | {id_keg, tanggal_keg, nama_keg,nama_risiko} |
| 8 | Rencana_mingguan | {id_rencana, minggu, bobot_rencana,pv} |
| 9 | RAB | {id_rab, id_proyek, jumlah, total} |
| 10 | Upah_tenaga | {jenis_pekerjaan, sat, harga_upah} |
| 11 | Material | {nama_material, sat, harga} |
| 12 | Struktur_pekerjaan | {id_strukpek, nama_pekerjaan, volume, satuan, keterangan} |
| 13 | Risiko | {id_res, nama_risiko, jenis_risiko,penanganan, deskripsi} |
| 14 | Laporan_mingguan | {id_lapming, minggu, bobot_aktual, ac} |

### *2.7 Functional Needs Analysis*

*In building information systems project management CV. MUKTI JAYA used modelling analysis tools include structured diagram context, data flow diagrams, data dictionaries and process specifications. The following diagram and context DFD level 1.*

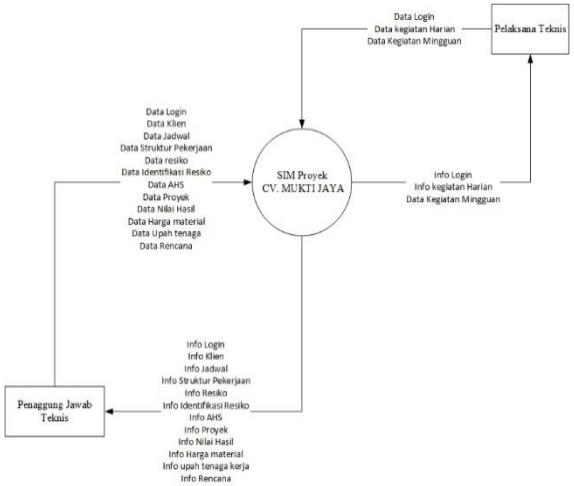



***Figure 5 the context Diagram***

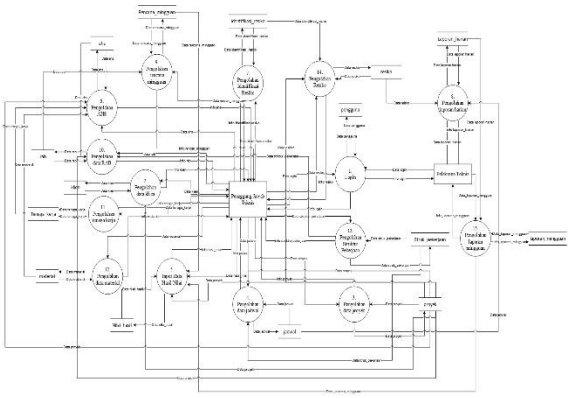


***Figure 6 DFD Level 1***

### *2.8 Design System*

*The design of the system is the definition of functional requirements and is a preparation for designing the wake system implementation or constitute how to describe a system that will be established. Beriku a relation scheme will be built on Figure 6 schematic relation*

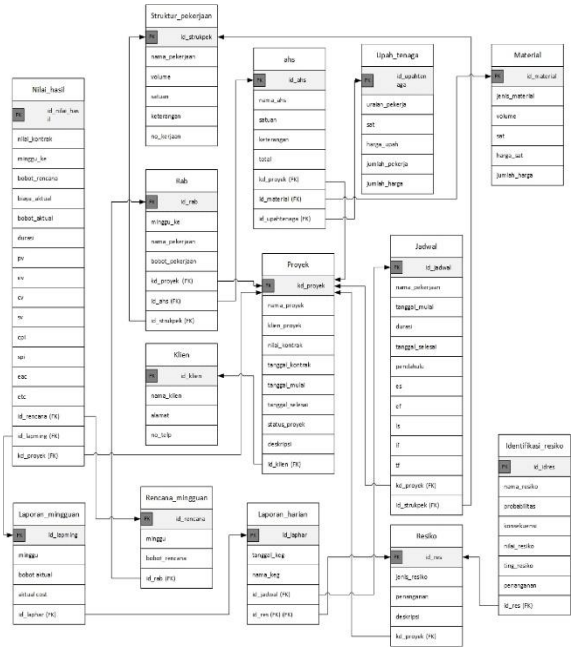


***Figure 7 Schemaic Relation***

### *2.9 Testing*

*Software testing i.e. all activities aiming to evaluate the attribute or the ability of a program or system and determines that the software testing met the required results. [4]*

#### *2.9.1 Blackbox Testing*

*Black box testing focuses on the functional requirements of the software. From the results of testing the blackbox has been done can be drawn the conclusion that the information systems project management CV. MUKTI JAYA will result in project management stages to suit the needs of a company like making schedules, making daily reports, weekly reports, and risk management. The system will produce the expected results if a user data menginputkan is right, and will give you a warning when the user enters the wrong data.*

#### *2.9.2 Beta testing*

*Beta testing is the testing that was done objectively where tested directly onto the field i.e. the corresponding agencies in fulfilment of the goals of the initial construction of information systems project management CV. MUKTI JAYA. Beta testing is done through a data capture techniques, i.e. by doing the interview. Interview done to users who use information systems project management CV. MUKTI JAYA that is in charge of technical and Technical Implementers.*

*Based on the answers of the interviewees, namely Penangung and technical Responsibility technical Implementer JAYA MUKTI CV then it can be drawn the conclusion that the system that is being built is enough to help companies meet in handling the project management of the mambuat schedule, keep an eye on costs and time course of the project, making analysis of the unit price, making budget plan costs, risk management, creation and production daily reports weekly reports.*

## *3. CLOSING*

*Results from research that has been done, the conclusion that the application of project management information system can help the technical person in charge in the schedule of the project, sehinggan known dependence between jobs, oversaw the project in terms of cost or time based on the reports in automatically by the system to calculate whether or not according to the plan, and identified the likely risk that arise during the project work as well as the estimated costs for the risks.*

*There are some suggestions that can be made for application development project management information systems, among others:*

1. *1. Information systems project management CV. MUKTI JAYA can be added some extra features such as notifications if a job is not completed on schedule.*
2. *2. Expected kedepanya this application is able to calculate the profit of the company at any level of the project.*

## *BIBLIOGRAPHY*


[1] Widisanti, Irika, & Lenggogeni, "*Manajemen Konstruksi"*, Penerbit Rosda, 2013

[2] Project Management Institute, *A GUIDE TO THE PROJECT MANAGEMENT BODY OF KNOWLEDGE (PMBOK Guide) – Fifth Edition*, 2013

[3] Soeharto, Iman. *Manajemen Poyek: Dari Konseptual Sampai Operasional.* Jakarta : Erlangga, 1999.
[4] Al Bahra Bin Ladjamudin. *Rekayasa Perangkat Lunak.* Tangerang: Graha Ilmi, 2006