PROJECT MANAGEMENT INFORMATION SYSTEM IN PT. RESOLUSI ARTHA INDONESIA

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ABSTRACT

PT. RESOLUTION ARTHA INDONESIA is a company engaged in consulting. Of some of the projects done before there is a problem that is, a discrepancy between the plan and the implementation of which is a schedule made only using the estimated time of the project based Gantt chart when in fact require the determination of distance estimation was based on survey line through which the scheduling is done only refers to the existing activities the budget plan undetected linkages between work and critical work, the absence of risk identification at the beginning as well as the handling solutions has also become one of the factors that can create problems in the implementation of the project, as well as cost control is done simply comparing the actual costs and plan costs without comparing progress or achievement of the work already done. Based on the problems that exist today, it is necessary to project management information system in PT. RESOLUTION ARTHA INDONESIA. The aim is to assist in determining the distance of a survey based on survey line traversed and identifying linkages between the work and identify critical job by using Critical Path Method in order to know any job that can not be postponed, to help manage and identify risks by using Probability Impact Matrix and assist in controlling costs and project time using Earned Value Management. Based on the problems that exist today, it is necessary to project management information system in PT. RESOLUTION ARTHA INDONESIA. The aim is to assist in determining the distance of a survey based on survey line traversed and identifying linkages between the work and identify critical job by using Critical Path Method in order to know any job that can not be postponed, to help manage and identify risks by using Probability Impact Matrix and assist in controlling costs and project time using Earned Value Management. Based on the problems that exist today, it is necessary to project management information system in PT. RESOLUTION ARTHA INDONESIA. The aim is to assist in determining the distance of a survey based on survey line traversed and identifying linkages between the work and identify critical job by using Critical Path Method in order to know any job that can not be postponed, to help manage and identify risks by using Probability Impact Matrix and assist in controlling costs and project time using Earned Value Management.

Keywords: Project Management, Information Systems, Critical Path Method, Earned Value Management, Probabbility Impact Matrix

1. PRELIMINARY

PT. RESOLUTION ARTHA INDONESIA is one of the consulting firmlocated in Bekasi.

Based on the interview with Mr. Yuyus Suprihat as the Manager of Administration and Facilities PT. RESOLUTION ARTHA INDONESIA stated that there were some problems in the implementation of the project in PT. RESOLUTION ARTHA INDONESIA caused by several factors:in addition, the absence of identification of risk at the beginning that caused the risk borne by the Administration and Facility at the time of the survey team conducted its own survey into the field, these risks are categorized based on the risks that occur in the field such as risk tools, natural hazards, the risk of labor perkategori problem can be seen in constraints and project management report (Appendix F-7). Based on the problems mentioned enable the company must perform additional work schedule and also have to spend extra costs in excess of the budget plan that has been determined at SPPP (Work Implementation Agreement). If there is such a thing then the PT. RESOLUTION ARTHA INDONESIA must pay fines for project undertaken by PT.

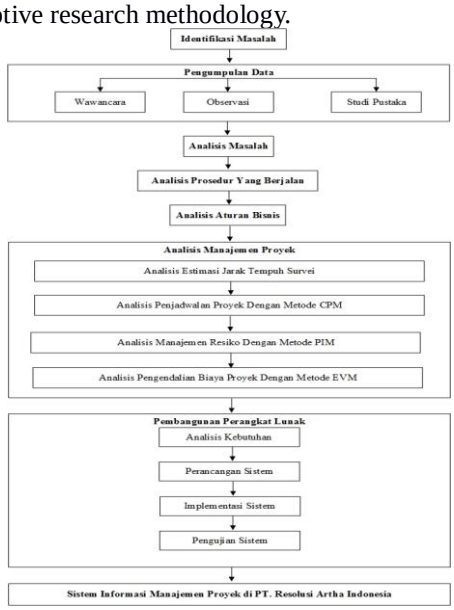
Based on these problems, solutions are needed to address the issues raised in the PT. RESOLUTION ARTHA INDONESIA, wherein scheduling of projects that go beyond the prescribed schedule can be overcome by using CPM (Critical Path Method) to see the connection between the work in the specified schedule and see the critical path of the workflow so that when the work is more precise and focused work to be optimal and determination mileage surveys based on the path - the path taken surveys determined based on the estimation of the project that has been implemented. To reduce the

risk and things - things that can impede the course of a project will be accomplished by using the PIM (Probability Impact Matrix) is the method foranalyze the risks that could occur in the project by prioritizing risks for further analysis to quantitatively and actions based on the size of the risk. As for project cost control which is governed by the Administrative Manager and facilities, can be overcome by using EVM (Earned Value Management) is a method to facilitate the current cost control of the project and the project timeline. Thus the last to be built a web-based information system for project management which is expected to help the problems in the project PT. RESOLUTION ARTHA INDONESIA.

2. RESEARCH RESULT

2.1 Research Methodology

Methodology research used in this research is descriptive research methodology.



Picture 1 Research methodology

2.2 Analysis Project Planning

Project planning analysis contains a survey of distance estimation analysis, scheduling and project risk identification at the Railway Master Plan Planning Riau Province.

2.2.1 Estimated Mileage Survey Analysis

No.	Uraian Pekerjaan	Durasi (Hari)	Survei Jalur Utama (Trunk Line)	Survei Jalur Lokal (Feeder)	Jarak Jalur Utama (Trunk Line)	Jarak Jalur Lokal (Feeder)
KEGIATAN B : SURVEY TOPOGRAFI						
1	Pengukuran Situasi Jembatan dan Jalur Trase KA	24 hari	Jalur Rantau Prapat – Duri - Dumai	Jalur Pekanbaru – Perawang – Tanjung Buton	200 Km - 300 Km	200 Km - 350 Km
2	Pembuatan Peta Lay Out	6 Hari	Jalur Duri - Pekanbaru	Jalur Rengat – Kuala Enok	80 Km - 120 Km	80 Km - 170 Km
3	Pembuatan Gambar Situasi	12 Hari	Jalur Pekanbaru – Muara Lembu	Jalur Rokan IV Koto – Ujung Batu – Kandis – Duri - Dumai	100 Km - 160 Km	100 Km - 230 Km
4	Pembuatan Gambar Potongan Memanjang	24 Hari	Jalur Muara Lembu – Teknik Kuantan – Muaro.	Jalur Ceneiti – Air Molek – Pematang Reba – Sungai Akar – Km 8 – Enok – Kuala – Enok	80 Km - 130 Km	100 Km - 220 Km
5	Pembuatan Gambar Potongan Melintang	24 Hari	Jalur Pekanbaru – Jambi.	Jalur Teluk Kuantan – Rengat – Kuala Enok	150 Km - 170 Km	150 Km - 250 Km
Total Jarak Survei Topografi					≤ 880 Km	≤ 1220 Km
KEGIATAN C : SURVEY HIDROGRAFI DAN GEOTEKNIK						
1	Survey Geoteknik Lapangan	24 Hari	Jalur Rantau Prapat – Duri - Dumai	Jalur Pekanbaru – Perawang – Tanjung Buton	200 Km - 300 Km	200 Km - 350 Km
2	Survey Hidrologi	12 Hari	Jalur Duri - Pekanbaru	Jalur Rengat – Kuala Enok	80 Km - 120 Km	80 Km - 170 Km
3	Penyelidikan Geoteknik Laboratorium	12 Hari	Jalur Pekanbaru – Muara Lembu	Jalur Rokan IV Koto – Ujung Batu – Kandis – Duri - Dumai	100 Km - 160 Km	100 Km - 230 Km
4	Penyelidikan Hidrologi	6 Hari	Jalur Muara Lembu – Teknik Kuantan – Muaro.	Jalur Ceneiti – Air Molek – Pematang Reba – Sungai Akar – Km 8 – Enok – Kuala – Enok	80 Km - 130 Km	100 Km - 220 Km
5	Pengolahan Data Geoteknik dan Hidrologi	6 Hari	Jalur Pekanbaru – Jambi.	Jalur Teluk Kuantan – Rengat – Kuala Enok	150 Km - 170 Km	150 Km - 250 Km
Total Jarak Survei Hidrografi dan Geoteknik					≤ 880 Km	≤ 1220 Km

2.2.2 Analysis of Project Scheduling (Critical Path Method)

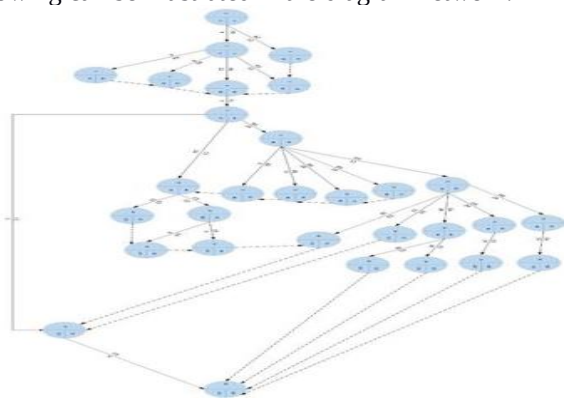
CPM (Critical Path Method) is a management technique that can be used to find the fastest track on every activity or project work [1].

Table 1 Project activities

activity	Event Codes	predecessor activity	Duration (days)
preparation team	A1	-	6 Days
Coordination with Related Agencies	A2	-	12 Days
Related Study Data Collection	A3	A1	12 Days
Potential Data Collection Transportation	A4	A1	6 Days
Geology and Hydrology Data Collection	A5	A1	6 Days
Preliminary survey	A6	A1	12 Days
Measurement Condition and Path Trace railway bridge	B1	F1	24 days
Mapping Lay Out	B2	B1	6 Days
Making the Image Situation	B3	B1	12 Days
Making the Pieces Picture Aft	B4	B1	24 Days
Making the Pieces Picture Melintang	B5	B1	24 Days
Geotechnical Survey Field	C1	F1	24 Days
Hydrology survey	C2	C1	12 Days
Geotechnical Investigations Laboratory	C3	C1	12 Days
Hydrological investigations	C4	C3	6 Days
Geotechnical and Hydrological Data Processing	C5	C3	6 Days
Mechanical Analysis of Soil	D1	D3	12 Days
Hydrological analysis	D2	D3	18 Day
Topography analysis	D3	B1	12 Days
KA Line Design	D4	D3	24 Days

Concepts			
Concept Design and Structure of the railway bridge	D5	D3	24 Days
Railway Infrastructure concept (stations etc.)	D6	D3	24 Days
Design of Railways	E1	D4	36 Day
Trace Line Design KA	E2	D4	36 Day
Bridge Design KA	E3	D5	24 Days
Railway Station Building Design	E4	D6	24 Days
Preliminary report	F1	A6	6 Days
Concepts Reports Final Report	F2	F1	6 Days
Final report	F3	F2	6 Days

Based on a series of activities in the project Railways Master Plan of Riau province, the following can be illustrated in the diagram network.



Picture 2 Diagram Network

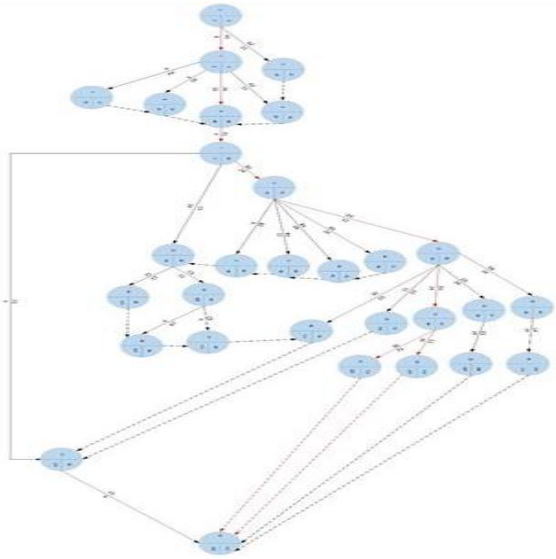
Use advanced calculation and countdown to specify a completion time with the CPM method [1].

Here is a recapitulation of the calculation of the CPM.

Table 2 Calculation Results recapitulation Network

Activity / Activity	Duration (days)	ICE	EF	LS	LF	TF	Status
A1	6 Days	0	6	0	6	0	Critical
A2	12 Days	0	12	0	18	6	not Critical
A3	12 Days	6	18	6	18	0	Critical
A4	6 Days	6	12	6	18	6	not Critical
A5	6 Days	6	12	6	18	6	not Critical
A6	12 Days	6	18	6	18	0	Critical
B1	24 days	24	48	24	48	0	Critical
B2	6 Days	48	54	48	96	42	not Critical
B3	12 Days	48	60	48	96	36	not Critical
B4	24 Days	48	72	48	96	24	not Critical
B5	24 Days	48	72	48	96	24	not Critical
C1	24 Days	24	48	24	96	48	not Critical
C2	12 Days	48	60	96	114	54	not Critical
C3	12 Days	48	60	96	108	48	not Critical
C4	6 Days	60	66	108	114	48	not Critical
C5	6 Days	60	66	108	114	48	not Critical
D1	12 Days	60	72	60	114	42	not Critical
D2	18 Day	60	78	60	114	36	not Critical
D3	12 Days	48	60	48	60	0	Critical
D4	24 Days	60	84	60	84	0	Critical
D5	24 Days	60	84	60	96	12	not Critical
D6	24 Days	60	84	60	96	12	not Critical
E1	36 Day	84	120	84	120	0	Critical
E2	36 Day	84	120	84	120	0	Critical
E3	24 Days	84	108	96	120	12	not Critical
E4	24 Days	84	108	96	120	12	not Critical
F1	6 Days	18	24	18	24	0	Critical
F2	6 Days	24	30	24	114	84	not Critical
F3	6 Days	30	36	114	120	0	Critical

Recapitulation of the table, it can be seen for jobs that are on the critical path is a job that has a total value of float equal to 0. Here are the calculations that have been changed into a network diagram.



Picture 3 CPM Network Diagram with Critical Path

2.2.3 Risk Management Analysis (Probability Impact Matrix)

In the process of risk management analysis has several stages of identifying .resiko, determine the value of probability, impact risks will occur, as well as the handling of these risks [2].

2.2.3.1 Risk identification

The risk management process begins with the identification of risks aimed at identifying and making a list of risks that may occur [2].

Table 3 Risk identification

No.	Risk	Risk Codes
1	**risk Tool**	
1.1	Equipment hired no	R1
1.2	Equipment leased damaged	R2
2	**Natural Risks**	
2.1	Natural conditions do not support	R3
2.2	Natural disasters	R4
3	**Labor Risk**	
3.1	Experts sick	R5
3.2	Team leader was unable to attend	R6

2.2.3.2 Determining the Value Likelihood and Impact

Furthermore, the risk will be assessed to provide the scale value using a rectangular matrix boston (Boston Square Matrix) [2].

Table 4 Boston Square Matrix

Possibility						
	Very high	5	10	15	20	25
	High	4	8	12	16	20
	moderate	3	6	9	12	15
	Low	2	4	6	8	10
	Very Low	1	2	3	4	5
		Very low	Low	moderate	High	Very high
		Impact				

Criteria for the impact assessment and the measurement of probability can be seen in the following table.

Table 5 Due Assessment Criteria / Impact

Value	appraisal	Result / Impact
1	Very low (Slight)	No significant impact is felt, the financial loss does not mean
2	Low (Minor)	It takes place directly handling
3	Medium (Significant)	Need to be addressed by the Technical Executive, delay significant duration.
4	High (Severe)	The presence of extra time on the schedule.
5	Very High (Major)	Need handling by managers, need handling khususs

Table 6 measurement Probability

Value	Parameter	Possibility
1	Very Low (Slight)	Occurs rarely, only in certain circumstances.
2	Low (Minor)	Sometimes occur in certain circumstances.
3	Medium (Significant)	Can occur in certain circumstances.
4	High (Severe)	Occur in certain circumstances.
5	Very High (Major)	Often occurs in certain conditions.

Boston matrix based on the assessment of any chance of risk and the impact made on the scale is 1 to 25 as described in the following table [2].

Table 7 level Skala Risk

Scale	value Risk
1-5	Low
6-14	moderate
15-25	High

The determination of the likelihood and impact of risk based on the decision of Administrative and Facility Manager PT. RESOLUTION ARTHA INDONESIA appropriate to the risks common in the Railway Master Plan projects previously Riau Province.

Table 8 Results and analysis possible in the industry Valuegkinan and Impact

No.	Risk	Risk	Possibility	Impact

		Codes		
1	**risk Tool**			
1.1	Equipment hired no	R1	2	2
1.2	Equipment leased damaged	R2	3	2
2	**Natural Risks**			
2.1	Natural conditions do not support	R3	4	2
2.2	Natural disasters	R4	3	5
3	**Labor Risk**			
3.1	Expert unable to attend	R5	2	2
3.2	Team Leader was unable to attend	R6	2	3

2.2.3.3 Interests MenentukanTingkat Risk

Once the value of the probability and impact of risk is determined, then the risk of interest rate calculation is done using Probability Impact Matrix [2].

Table 9 Interest rate Risk Calculation Results

No.	Risk Codes	Possibility	Impact	Importance of Risk
1	R1	2	2	4
2	R2	3	2	6
3	R3	4	2	8
4	R4	3	5	15
5	R5	2	2	4
6	R6	2	3	6

Based on the results of the calculation of the importance level of risk, then the risk will be created matrix. Risk matrix is a matrix to find the scale of low medium and high risk.

Table 10 Risk Matrix Generated from Calculation

No.	Risk	Risk Codes	Importance	Risk level
1	**risk Tool**			
1.1	Equipment hired no	R1	4	Low
1.2	Equipment leased damaged	R2	6	moderate
2	**Natural Risks**			
2.1	Natural conditions do not support	R3	8	moderate
2.2	Natural disasters	R4	15	High
3	**Labor Risk**			
3.1	Expert unable to attend	R5	4	Low
3.2	Team Leader was unable to attend	R6	6	moderate

1.1.1.1handling Risk

Based on the results of risk assessment of importance, then it will do the handling of risk mitigation or risk control measures by undertaking Technical.

Table 11 Risk control

Risk Codes	Risk level	Risk Management Measures
R1	Low	Looking for a rental place other device with a comparison price can not exceed the budget.
R2	Low	Returns immediately leased goods to be replaced with a functioning goods
R3	moderate	Wait until the natural conditions suitable to conduct survey and sample data retrieval.
R4	High	Evacuation of goods as well as the experts, support personnel, and team leader, and coordinating with the director for the continuation of future projects.
R5	moderate	Team Leader will warn experts to come up during a pre-determined schedule.
R6	moderate	Team Leader choose one of the experts who already trust to take his place and always in coordination with the team leaders in what would be done

2.3 Analysis of Project Cost Control (Earned Value Management)

Contains project control analysis stage to assist in evaluating the project to control costs and project time. Control project using Earned Value Management method [3].

2.3.1 Weight Calculation Jobs

To be able to evaluate the project, the first thing to do is to calculate the weight of each work [3].

Table 12 Weight Calculation Jobs

NO	activity	Price Employment (USD)	Weight(%)
A1	preparation team	69,000,000.00	4.18
A2	Coordination with Related Agencies	15,400,000.00	0.93
A3	Related Study Data Collection	15,400,000.00	0.93
A4	Potential Data Collection Transportation	15,400,000.00	0.93
A5	Geology and Hydrology Data Collection	15,400,000.00	0.93
A6	Preliminary survey	115,000,000.00	6.97
B1	Measurement Condition and Path Trace railway bridge	42,600,000.00	2.58

NO	activity	Price Employment (USD)	Weight(%)
B2	Mapping Lay Out	42,600,000.00	2.58
B3	Making the Image Situation	42,600,000.00	2.58
B4	Making the Pieces Picture Aft	42,600,000.00	2.58
B5	Making the Pieces Picture Melintang	42,600,000.00	2.58
C1	Geotechnical Survey Field	90,750,000.00	5.50
C2	Hydrology survey	73,250,000.00	4.44
C3	Geotechnical Investigations Laboratory	43,000,000.00	2.61
C4	Hydrological investigations	43,000,000.00	2.61
C5	Geotechnical and Hydrological Data Processing	44,500,000.00	2.70
D1	Mechanical Analysis of Soil	35,100,000.00	2.13
D2	Hydrological analysis	46,100,000.00	2.80
D3	Topography analysis	46,100,000.00	2.80
D4	KA Line Design Concepts	69,200,000.00	4.20
D5	Concept Design and Structure of the railway bridge	69,200,000.00	4.20
D6	Railway Infrastructure concept (stations etc.)	69,300,000.00	4.20
E1	Design of Railways	70,000,000.00	4.24
E2	Trace Line Design KA	70,000,000.00	4.24
E3	Bridge Design KA	70,000,000.00	4.24
E4	Railway Station Building Design	70,000,000.00	4.24
F1	Preliminary report	37,250,000.00	2.26
	Concepts Reports	45,750,000.00	2.77
F2	Final Report		
F3	Final report	48,000,000.00	2.91
	TOTAL	USD 1,499,100,000.00	
	TAX VAT 10%	USD 149 910 000	
	TOTAL + TAX VAT 10%	USD 1,649,010,000.00	

2.3.2 Analysis of Project Evaluation

Analysis of project evaluation contains a calculation to find the value of Planned Value (PV), Earned Value (EV), Actual Cost (AC), Cost Variance (CV), Scheduling Variance (SV), Schedule Performance Index (SPI), Cost Performance Index (CPI), Estimate at Completion (EAC) and the Estimate to Complete (ETC) [3].

Table 13 Weight Plan Works

Periode	Uraian Pekerjaan	BOBOT	
		Rencana	Total
Minggu 1	Persiapan Tim	4,18%	4,65%
	Koordinasi Dengan Instansi Terkait	0,47%	
Minggu 2	Koordinasi Dengan Instansi Terkait	0,47%	6,28%
	Pengumpulan Data Studi terkait	0,47%	
	Pengumpulan Data Potensi Transportasi	0,93%	
	Pengumpulan Data Geologi dan Hidrologi	0,93%	
	Survei Pendahuluan	3,48%	
Minggu 3	Survei Pendahuluan	3,48%	3,95%
	Pengumpulan Data Studi terkait	0,47%	
Minggu 4	Laporan Pendahuluan	2,26%	2,26%
Minggu 5	Pengukuran Situasi Jembatan dan Jalur Trasi KA	0,64%	2,01%
	Survei Geoteknik Lapangan	1,37%	
Minggu 6	Pengukuran Situasi Jembatan dan Jalur Trasi KA	0,64%	2,01%
	Survei Geoteknik Lapangan	1,37%	
Minggu 7	Pengukuran Situasi Jembatan dan Jalur Trasi KA	0,64%	4,23%
	Survei Geoteknik Lapangan	1,37%	
	Survei Hidrologi	2,22%	
Minggu 8	Pengukuran Situasi Jembatan dan Jalur Trase KA	0,64%	6,84%
	Survei Geoteknik Lapangan	1,37%	
	Survei Hidrologi	2,22%	
	Penyelidikan Hidrologi	2,61%	
Minggu 9	Pembuatan Peta Lay Out	2,58%	7,87%
	Pembuatan Gambar Situasi	1,29%	
	Pembuatan Gambar Potongan Memanjang	0,65%	
	Pembuatan Gambar Potongan Melintang	0,65%	
	Penyelidikan Geoteknik Laboratorium	1,30%	
	Analisa Topografi	1,40%	
Minggu 10	Pembuatan Gambar Situasi	1,29%	9,38%
	Pembuatan Gambar Potongan Memanjang	0,65%	
	Pembuatan Gambar Potongan Melintang	0,65%	
	Penyelidikan Geoteknik Laboratorium	1,30%	
	Analisis Hidrologi	0,94%	
	Analisa Topografi	1,40%	
	Konsep Desain Jalur KA	1,05%	
	Konsep Desain dan Struktur Jembatan KA	1,05%	
	Konsep Prasarana Kereta (Stasiun dll)	1,05%	
Minggu 11	Pembuatan Gambar Potongan Memanjang	0,65%	10,57%
	Pembuatan Gambar Potongan Melintang	0,65%	
	Pengolahan Data Geoteknik dan Hidrologi	2,70%	
	Analisis Mekanikal Tanah	1,06%	
	Analisis Hidrologi	0,94%	
	Konsep Desain Jalur KA	1,05%	
	Konsep Desain dan Struktur Jembatan KA	1,05%	
	Konsep Prasarana Kereta (Stasiun dll)	1,05%	
	Desain Jalan Kereta Api	0,71%	
	Desain Jalur Trase KA	0,71%	
Minggu 12	Pembuatan Gambar Potongan Memanjang	0,65%	7,87%
	Pembuatan Gambar Potongan Melintang	0,65%	
	Analisis Mekanikal Tanah	1,06%	
	Analisis Hidrologi	0,94%	
	Konsep Desain Jalur KA	1,05%	
	Konsep Desain dan Struktur Jembatan KA	1,05%	
	Konsep Prasarana Kereta (Stasiun dll)	1,05%	
	Desain Jalan Kereta Api	0,71%	
	Desain Jalur Trase KA	0,71%	
Minggu 13	Konsep Desain Jalur KA	1,05%	8,40%
	Konsep Desain dan Struktur Jembatan KA	1,05%	
	Konsep Prasarana Kereta (Stasiun dll)	1,05%	
	Desain Jalan Kereta Api	0,71%	
	Desain Jalur Trase KA	0,71%	
	Desain Jembatan KA	1,06%	
	Laporan Konsep Laporan Akhir	2,77%	
Minggu 14	Desain Jalan Kereta Api	0,71%	2,48%
	Desain Jalur Trase KA	0,71%	
	Desain Jembatan KA	1,06%	
Minggu 15	Desain Jalan Kereta Api	0,71%	2,48%
	Desain Jalur Trase KA	0,71%	
	Desain Jembatan KA	1,06%	
Minggu 16	Desain Jalan Kereta Api	0,71%	2,48%
	Desain Jalur Trase KA	0,71%	
	Desain Jembatan KA	1,06%	
Minggu 17	Desain Bangunan Stasiun KA	1,06%	1,06%
Minggu 18	Desain Bangunan Stasiun KA	1,06%	1,06%
Minggu 19	Desain Bangunan Stasiun KA	1,06%	1,06%
Minggu 20	Desain Bangunan Stasiun KA	1,06%	1,06%
	Laporan Akhir	6,00%	6,00%
Minggu 21	Laporan Akhir	6,00%	6,00%

Table 14 Weights Project Implementation Progress

Periode	Uraian Pekerjaan	Bobot	Bobot Rencana	Bobot Pelaksanaan
Minggu 1	Persiapan Tim	4,18%	4,65%	100%
	Koordinasi Dengan Instansi Terkait	0,47%		
Minggu 2	Koordinasi Dengan Instansi Terkait	0,47%	6,28%	100%
	Pengumpulan Data Studi terkait	0,47%		
	Pengumpulan Data Potensi Transportasi	0,93%		
	Pengumpulan Data Geologi dan Hidrologi	0,93%		
	Survei Pendahuluan	3,48%		
Minggu 3	Survei Pendahuluan	3,48%	3,95%	100%
	Pengumpulan Data Studi terkait	0,47%		
Minggu 4	Laporan Pendahuluan	2,26%	2,26%	100%
Minggu 5	Pengukuran Situasi Jembatan dan Jalur Trasi KA	0,64%	2,01%	100%
	Survei Geoteknik Lapangan	1,37%		
Minggu 6	Pengukuran Situasi Jembatan dan Jalur Trasi KA	0,64%	2,01%	100%
	Survei Geoteknik Lapangan	1,37%		
Minggu 7	Pengukuran Situasi Jembatan dan Jalur Trasi KA	0,64%	4,23%	100%
	Survei Geoteknik Lapangan	1,37%		
	Survei Hidrologi	2,22%		
Minggu 8	Pengukuran Situasi Jembatan dan Jalur Trase KA	0,64%	6,84%	100%
	Survei Geoteknik Lapangan	1,37%		
	Survei Hidrologi	2,22%		
	Penyelidikan Hidrologi	2,61%		
Minggu 9	Pembuatan Peta Lay Out	2,58%	7,87%	100%
	Pembuatan Gambar Situasi	1,29%		
	Pembuatan Gambar Potongan Memanjang	0,65%		
	Pembuatan Gambar Potongan Melintang	0,65%		
	Penyelidikan Geoteknik Laboratorium	1,30%		
	Analisa Topografi	1,40%		
Minggu 10	Pembuatan Gambar Situasi	1,29%	9,38%	100%
	Pembuatan Gambar Potongan Memanjang	0,65%		
	Pembuatan Gambar Potongan Melintang	0,65%		
	Penyelidikan Geoteknik Laboratorium	1,30%		
	Analisis Hidrologi	0,94%		
	Analisa Topografi	1,40%		
	Konsep Desain Jalur KA	1,05%		
	Konsep Desain dan Struktur Jembatan KA	1,05%		
	Konsep Prasarana Kereta (Stasiun dll)	1,05%		
Minggu 11	Pembuatan Gambar Potongan Memanjang	0,65%	10,57%	100%
	Pembuatan Gambar Potongan Melintang	0,65%		
	Pengolahan Data Geoteknik dan Hidrologi	2,70%		
	Analisis Mekanikal Tanah	1,06%		
	Analisis Hidrologi	0,94%		
	Konsep Desain Jalur KA	1,05%		
	Konsep Desain dan Struktur Jembatan KA	1,05%		
	Konsep Prasarana Kereta (Stasiun dll)	1,05%		
	Desain Jalan Kereta Api	0,71%		
	Desain Jalur Trase KA	0,71%		
Minggu 12	Pembuatan Gambar Potongan Memanjang	0,65%	7,87%	100%
	Pembuatan Gambar Potongan Melintang	0,65%		
	Analisis Mekanikal Tanah	1,06%		
	Analisis Hidrologi	0,94%		
	Konsep Desain Jalur KA	1,05%		
	Konsep Desain dan Struktur Jembatan KA	1,05%		
	Konsep Prasarana Kereta (Stasiun dll)	1,05%		
	Desain Jalan Kereta Api	0,71%		
	Desain Jalur Trase KA	0,71%		
Minggu 13	Konsep Desain Jalur KA	1,05%	8,40%	100%
	Konsep Desain dan Struktur Jembatan KA	1,05%		
	Konsep Prasarana Kereta (Stasiun dll)	1,05%		
	Desain Jalan Kereta Api	0,71%		
	Desain Jalur Trase KA	0,71%		
	Desain Jembatan KA	1,06%		
	Laporan Konsep Laporan Akhir	2,77%		
Minggu 14	Desain Jalan Kereta Api	0,71%	2,48%	100%
	Desain Jalur Trase KA	0,71%		
	Desain Jembatan KA	1,06%		
Minggu 15	Desain Jalan Kereta Api	0,71%	2,48%	100%
	Desain Jalur Trase KA	0,71%		
	Desain Jembatan KA	1,06%		
Minggu 16	Desain Jalan Kereta Api	0,71%	2,48%	100%
	Desain Jalur Trase KA	0,71%		
	Desain Jembatan KA	1,06%		
Minggu 17	Desain Bangunan Stasiun KA	1,06%	1,06%	100%
Minggu 18	Desain Bangunan Stasiun KA	1,06%	1,06%	100%
Minggu 19	Desain Bangunan Stasiun KA	1,06%	1,06%	100%
Minggu 20	Desain Bangunan Stasiun KA	1,06%	7,06%	100%
	Laporan Akhir	6,00%		
Minggu 21	Laporan Akhir	6,00%	6,00%	100%

From the table plan weight work and the weight of the progress of the project can be calculated the value of Planned Value (PV), Earned Value (EV), Actual Cost (AC), Cost Variance (CV), Scheduling Variance (SV), Schedule Performance Index (SPI), cost Performance Index (CPI), Estimate at Completion (EAC) and the Estimate to Complete (ETC), which can be seen in the following table.

Table 15 Recapitulation in Calculating Earned Value Management

Sunday	**variant analysis**		**performance analysis**		**Estimates analysis**	
	SV time	**Cost CV**	**SPI time**	**Cost CPI**	**time ETC**	**Cost EAC**

Sunday	variant analysis		performance analysis		Estimates analysis	
	SV time	Cost CV	SPI time	Cost CPI	time ETC	Cost EAC
Week 1	Rp. 0	Rp178.965	1.00	1.00	180 days	Rp. 1.649011 billion
Week 2	Rp. 0	Rp57.828	1.00	1.00	180 days	Rp. 1.649011 billion
Week 3	Rp. 0	Rp135.895	1.00	1.00	180 days	Rp. 1.649011 billion
Week 4	Rp. 0	Rp267.626	1.00	0.99	180 days	Rp. 1665666667
Week 5	Rp. 0	-Rp4.899	1.00	1.00	180 days	Rp. 1.649011 billion
Week 6	Rp. 0	-Rp4.899	1.00	1.00	180 days	Rp. 1.649011 billion
Week 7	Rp. 0	-Rp246.877	1.00	1.00	180 days	Rp. 1.649011 billion
Week 8	Rp. 0	Rp292.284	1.00	1.00	180 days	Rp. 1.649011 billion
Week 9	Rp. 0	-Rp222.913	1.00	1.00	180 days	Rp. 1.649011 billion
Week 10	Rp. 0	-Rp2.322.862	1.00	1.03	180 days	Rp. 1600980583
Week 11	Rp. 0	-Rp5.699.643	1.00	1.00	180 days	Rp. 1.649011 billion
Week 12	Rp. 0	-Rp222.913	1.00	1.00	180 days	Rp. 1.649011 billion
Week 13	Rp. 0	-Rp1.483.160	1.00	1.00	180 days	Rp. 1.649011 billion
Week 14	Rp. 0	Rp95.448	1.00	1.00	180 days	Rp. 1.649011 billion
Week 15	Rp. 0	Rp95.448	1.00	1.00	180 days	Rp. 1.649011 billion
Week 16	Rp. 0	Rp95.448	1.00	1.00	180 days	Rp. 1.649011 billion
Week 17	Rp. 0	-	1.00	1.00	180 days	Rp. 1.6490
		Rp20.494				1 billion
Week 18	Rp. 0	-Rp20.494	1.00	1.00	180 days	Rp. 1.649011 billion
Week 19	Rp. 0	-Rp20.494	1.00	1.00	180 days	Rp. 1.649011 billion
Week 20	Rp. 0	Rp420.106	1.00	1.00	180 days	Rp. 1.649011 billion
Week 21	Rp. 0	Rp440.600	1.00	1.00	180 days	Rp. 1.649011 billion

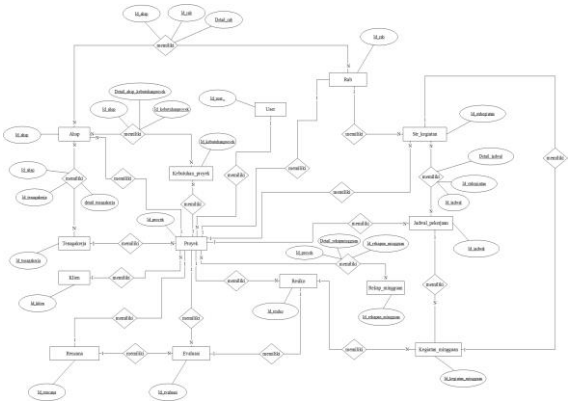
Based on the recapitulation of project performance using EVM, it was concluded as follows:

Total Time Plan = 180 days
Total Time Actual = 180 days
BAC = 1,649,010,000.00
PV = 1,649,010,000.00
AC = 1,643,200,000.00
CV = - 5,810,000.00
Estimated time remaining completion time = 180-180 = 0 days
Estimated time remaining settlement costs = 1,643,200,000.00 to 1,649,010,000.00 = - 5,810,000.00

In planning the project Railways Master Plan Riau Province during the remaining time 0 days, this means that the overall project timeline according to planned. For the remainder of the project's completion cost is Rp - 5,810,000.00, which means that the cost of completion of the project exceeds the cost that has been planned. This cost overrun occurred on the sixth week of the project.

2.4 Analysis Database

Analysis of the database is the analysis stage to describe the desired system in the form of relations between the entities involved in the project management information system in PT. RESOLUTION ARTHA INDONESIA



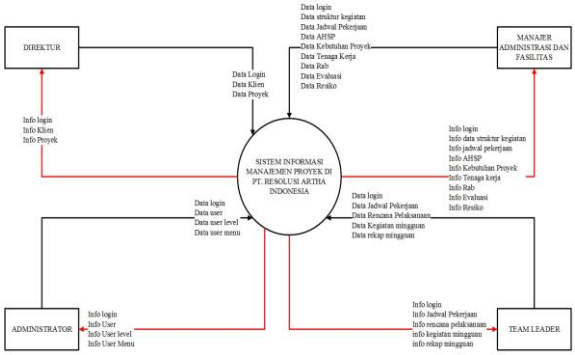
Picture 4 Entity Relational Diagram

Table 16 Description Attributes Entities In ERD

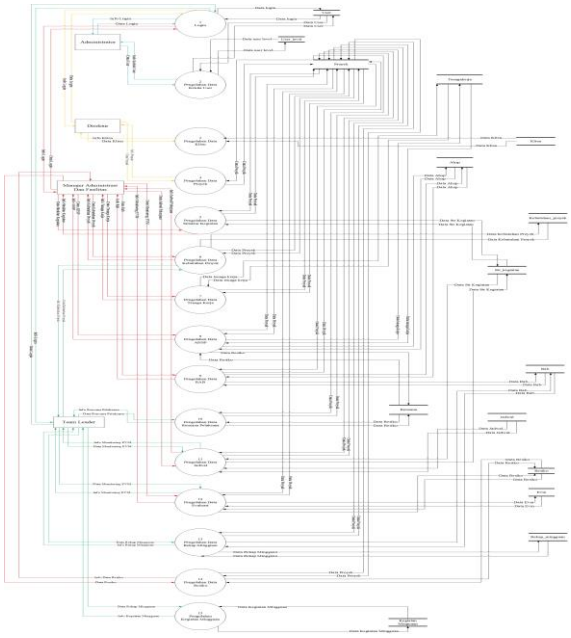
No.	name of Entity	Attribute
1	project	Id_proyek, Id_klien, id_user, no_kontrak, nm_proyek, jenis_pekerjaan, nilai_kontrak, tgl_kontrak, tgl_mulai, tgl_selesai, duration, masa_pelaksanaan, location, status_proyek.
2	kebutuhan_proyek	Id_kebutuhanproyek, id_proyek, nm_kebutuhan, units, prices.
3	EVM	Id_evm, Id_proyek, weeks, id_rencana, bobot_realisasi, aktual_cost, pv, ev, cv, sv, cpi, spi, eac, etc, id_resiko.
4	plan	Id_rencana, Id_proyek, weeks, bobot_rencana, pv.
5	client	Id_klien, Nm_klien, address, phone number, status.
6	labor	Id_tenagakerja, Id_proyek, jenis_tenagakerja, unit price, quantity.
7	ahsp	Id_ahsp, Id_proyek, nama_analisa, units, description, total_kebutuhan_proyek, totaltenaga, total.
8	rab	Id_rab, Id_proyek, jumlah_total.
9	str_kegiatan	Id_strkegiatan, No_kegiatan, id_proyek, nama_kegiatan, jalur_utama, jalur_lokal, jarak_jalur_utama, jarak_jalur_lokal.
10	work schedule	Id_jadwal, Id_proyek.
11	risks	id_risiko, Id_proyek, jenis_resiko, kode_resiko, nama_resiko, probability, impact, tingkat_resiko handling,
12	rekap_mingguan	Id_rekap_mingguan, Id_proyek, minggu_ke
13	detail_ahsp_kebutuhanproyek	Id_detail_ahsp_kebutuhanproyek, Id_ahsp, id_kebutuhanproyek, nama_sumberdaya, quantity, unit, harga_satuan, price.
14	detail_ahsp_tenaga	Id_detail_ahsp_tenaga, Id_ahsp, id_tenagakerja, nama_sumberdaya, quantity, unit, harga_satuan, price.
15	detail_rekapmingguan	Id_rekap_mingguan,
		id_proyek, id_rekap_mingguan, id_detail_rab, minggu_ini, biaya_minggu_ini.
16	detail_jadwal	Id_detail_jadwal, id_jadwal, id_strkegiatan, start, finish, duration, ice, ef, ls, lf, tf.
17	detail_rab	Id_detail_rab, Id_rab, id_strkegiatan, id_ahsp, harga_satuan, jumlah_harga
18	user	Id_user, Username, name, password, id_user_level, status.

2.5 Functional Needs Analysis

Analysis of functional requirements describe the process of the activities to be implemented in the system and explain the necessary requirements for the system to run smoothly and according to need.



Picture 5 diagram Context



Picture 6 DFD Level 1

2.6 System planning

Design System is the depiction, planning, and making a sketch or arrangement of several separate systems into a cohesive whole. This stage includes configuring the software components and hardware of a system.

Picture 7 Relation scheme

2.7 examination

The test aims to find errors - errors and deficiencies - deficiencies in the software being tested. The test aims to determine the software that made it meets the criteria in accordance with the design objectives or not.

2.7.1 Blackbox testing

Testing the system using the method *blackbox* done on the functions of the system to determine whether the function has been run as expected or not.

2.7.2 Beta testing

Beta testing is testing conducted objectively where testing is done directly to the field is an agency concerned about user satisfaction with the content of the points is fulfillment of the original purpose of construction of the Project Management Information System in PT. RESOLUTION ARTHA INDONESIA and interface of project management information system in PT. RESOLUTION OF INDONESIA ARTHA it. Beta testing is done through a data retrieval technique, namely through interviews. Interviews were conducted in accordance with the beta testing system permissions. Interviews were conducted against Ms. Hani Mulyani as Director, Mr. Yuyus Suprihat as the Manager of Administration and Facilities, and Mr. M Ridwan as Team Leader of the project management information system in PT. RESOLUTION ARTHA INDONESIA.

3 COVER

The results of the study and the results of testing that has been done, it could be concluded that the system can help managers of administration and facilities in determining the distance estimation surveys based on mileage, manage project schedule and identify the linkages between the work and the critical path, identify risks before the project is implemented based on the calculation looking for a level of risk, and was able to assist in controlling costs and time by comparing the progress or achievement of the work done that is presented in tabular form the results of calculations.

There are some suggestions that can be done for the development of project management information system applications, among others:

1. Subsequent research project management information system is expected to provide validation range at the time and distance estimation survey determined based on mileage.
2. Future studies are expected to also improve the interface for web browsers as well as the mobile version would be better to enter job data can be imported from Microsoft Excel (.xls).

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