



Manual Business Management

Labour-Based Technology for Rural Road Works



**Don Bosco Foundation
Training Center in Comoro**

Training Manual

**Business
Management
for
Labour-Based Road
Construction**

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Manual, Managing Your Road Construction Business

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Introduction

This manual, "Manage your Road Construction Business" has been developed to complement the training materials developed by IADE for the National Certificate "Managing Small Construction Bids and Contracts". It is intended for use by directors, engineers and administrative staff of companies involved in the rural road construction works, but can also be used to train public works officials involved in contracts management and personnel from consultancy firms. This module targets specifically small construction businesses involved in rural road contracts using a labour-based approach.

Financing your business

Training module on the Financing Your Business session has been developed and is being used by IADE for Business Management training. This training material will be used for the session of the Financing your business.

Chapter 1: Cash flow

Your cash flow record shows all cash items received and paid during a certain period, this can be eg weekly, monthly or yearly. If you do not have enough cash you cannot pay for necessary inputs such as construction materials and your company cannot employ workers if there is no cash to pay to them, etc. Your cash flow determines the amount of money you have available and what you can pay at any given time, and this knowledge is vital for your planning and implementation of your project.

Cash flow in a business can thought of as a water tank, with a tap to fill the tank and an outlet to release water at the bottom of the tank. Initially the water tank is full of water- in business this is the owner's capital. However, if the outlet is not closed the water flows out from the hole at the bottom of the tank - owner's capital also flows out when you spend the money for wages, fuel, material, equipment etc. Money must therefore also flow in to avoid that the capital gets finished - like opening the tap to fill water in the tank - in the form of payment from clients, temporary loans from the bank and other financial sources. If the level of water is low - you have very little capital - then your business is in trouble. If the water tank is empty - if you have no capital then your business will collapse!

1.1 What you need to know

Cash flow for a business must be thoroughly analyzed, looking at cash coming into the business and cash that has to be paid for operations for the business in order to make a solid cash flow plan.

Cash flow-in (Cash flow incomes): The cash flow-in is the cash generated by your business. In most civil construction contracts, you should be paid by the client on a monthly basis, i.e. you should be paid for work carried out during the previous month. Even if your client pays an advance payment for your new contract, your advance will still usually take a couple of weeks to process. Therefore, in order to start and mobilize your project in a timely manner, you need to use your own capital. If you do not have sufficient

capital you may decide to apply for a bank loan, with the amount determined in cash flow forecast (or cash flow plan, which is described in 2.2 below), to help you to mobilize the work. In some cases, you might even have to sell some of your assets to generate your needed cash inflow.

The cash flow-in for construction work is divided into several phases. For more details of the cash flow income, see **chapter 1.4**

Cash flow-out (Cash flow cost): when you start mobilizing a new construction contract you will have to pay for the site preparation, purchasing construction materials, hiring of equipment, etc. Once the work is in progress you need to spend cash for labour wages and materials, interests on your loans, etc.

Your capital is the fuel that moves your business. If you run out of the fuel your business will stop. If your capital is at risk you should find way to refuel your tank and to reduce the outflow. That could be looking for a loan with the amount needed or decreasing your expenditure or business transactions to adjust to your available budget. For more details of the cash flow cost, see **chapter 1.3**

Cash flow forecast/Cash flow plan: forecasting cash flow and budgeting for your construction project is essential for the success of your business. With your cash flow plan you can control your cash flow-in (income) and your cash flow-out (cost) for a certain period of time. The cash flow plan helps you balance your cash in with your cash out and will tell you when you have to claim payment from the client in order to have sufficient capital for the required inputs and payments to keep your work progressing smoothly. For more details of the cash flow plan, see **chapter 1.2**.

Cash flow analysis: cash flow analysis is an invaluable exercise that gives information about your business, how much income it generated and how much cash and you spent. It is very useful to analyze the cash flow in your past projects to understand why your cash flow increased or decreased. This understanding will help you when forecasting and developing future cash flow plans. The cash flow analysis also shows you if you have shortage of cash to run your construction business. For more details of the cash flow analysis, see **Chapter 1.5**

1.2 Forecasting cost (Cash flow plan)

Before you make a cash flow forecast you need to know the cash flow-in and cash flow-out. In order to prepare your cash flow plan you should estimate your cash flow in and your cash flow out for each month. If your project is small you can even do it on a weekly or bi-weekly basis. The monthly cash flow plan shows your expected cash flow in and your expected cash flow out of the project each month during the entire period of the project. The difference between these two numbers tells you how much money should be available in your company at the beginning of each month. Note that your costs are usually higher than your income in the initial stage of your project.

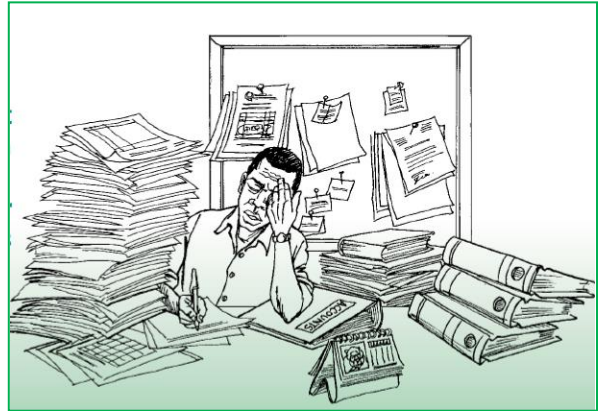
To prepare the cash flow plan you need to know:

- ✓ Project's time schedule (which you must prepare and submit in your bid)
- ✓ Direct cost and timing of activities of the project (estimate)

- ✓ Indirect cost of the project (estimate)
- ✓ Income of your project, your estimated amount and timing of your claims (your payment from the client)
- ✓ Method and process of payment (from the condition of the contract)
- ✓ The possibility of delays in payment (from experiences)

To prepare your cash flow plan for a construction business you should follow the steps below.

Step 1: Prepare time schedule to complete your work. The time schedule should include all work items to be completed within the period of the contract. The time schedule for your construction project is normally prepared during the submission of the bid. If the time schedule or work plan is still valid you should use it when preparing your cash flow plan. The **Diagram 01** below is an example of the time schedule for a road construction



project. The time schedule shows some basic details of the project, such as: items of work to be done, quantities of the works, bid price for each item of the work and time to complete each item work and the duration of the whole project.

Contractor's Work Programme for the rehabilitation of a road work

Diagram - 01

No.	Description	Works				Jun-15				Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Progress %		
		Unit	Qty.	Bid price. \$	%	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
1	General item	Ls	1	3670	2.6	1.76																				0.88	100					
	ROAD WORKS																															
2	Bush cutting, grass clearing and grubbing	m²	15,400	2,772	2.0	1.99																										
3	Cut to spoil-soft soil	m³	925	4,625	3.3		1.11				2.22																					
4	Cut to spoil - soft rock	m³	75	1,200	0.9						0.86																80					
5	Levelling from cut	m³	815	7,033	5.1						3.37				1.68																	
6	Fill for leveling from borrow within 150 m	m³	575	5,532	4.0							1.33				2.65																
7	Fill to form camber from borrow within 150 m	m³	1,000	9,620	6.9												2.30				4.61								60			
8	Gravel surface (12-15 cm)	m³	1,125	23,726	17.1																		11.37				5.68					
9	Penetration Macadam	m²	500	14,300	10.3																							10.28				
10	Stone masonry lined drain (1,050m)	m³	325	33,150	23.8						7.94				7.94				7.94													
11	Gabion	m³	80	5,400	3.9						0.97				0.97				0.97				0.97								40	
12	SLAB CULVERT (11 locations)			19,118	13.7		1.53				3.05				3.05				3.05				3.05									
13	DRIFT (1)			8,802.00	6.3													2.11				2.11				2.11						
14	Project sign boards	No	1	70	0.1																					0.05	20					
15	Guide posts installation and painting	No	4	120	0.1																					0.09						
TOTAL WORKS				139,138	100.0																											
Monthly progress (in %)						6.4				19.7				18.6				18.7				17.5				19.1						
Cumulative progress (in %)						6.4				26.1				44.7				63.4				80.9				100.0						

Step 2: It is important to plan for your cash flow-out first. The cash flow-out is normally the cash you spend for direct costs including: labour cost, material cost, equipment cost and hand tools, and also indirect costs such as office cost and cost for management and supervision.

Step 3: Look at your unit rate analysis for each item of your project (you must prepare unit rates before you prepare your bid). Your unit rates include direct and indirect costs:

Direct cost = labour cost + material cost + cost of equipment and hand tools

In-direct cost includes:

- ✓ Supervision cost 6.5 % of direct cost,
- ✓ Risk allowance 2% of direct cost
- ✓ Company cost 4 % of direct cost
- ✓ Profit + Tax 7 % of direct cost

Step 4: You can calculate the direct cost of each work item by deducting the indirect cost from the total unit price. The in-direct cost is 19.5%. $\text{Direct cost} = 100\% - 19.5\% = 80.5\%$

Step 5: Calculate total direct cost of each item = 0.805 (80.5%) x cost of each item.

Step 6: Allocate, based on your time schedule, direct cost for each work item for each month. Continue this process for all work items.

Step 7: Calculate the indirect costs that you need to consider for the cash flow out. These include Supervision Cost (6.5%) and Company Costs (4%), but not risk allowance or profit. Calculate Supervision and Company cost for the whole project (10.5% of the total cost) and then allocate this cost equally for each month till end of the project time frame.

Step 8: Summarize direct cost for each item for each month and include the Supervision and Company cost you have allocated for each month. From this process you will find the total amount of cash required for each month.

Step 9: Repeat the same process for every month till end of the time frame of the project.

Look at an example to prepare a cash flow plan for a road rehabilitation work.

Contractor **[A]** has been awarded a contract to rehabilitate a road. The total contract amount is US\$ 139,138. The duration of the contract is 6 months, from June 2015 to November 2015. The engineer of the contractor **[A]** has prepared the work program to complete the rehabilitation work as shown in **Diagram 01** above

From the work program the engineer calculated total "direct cost" of each work item and then "direct cost" of total contract.

- a) In this example the overhead cost is 19.5 % of total cost therefore the "direct cost"
- b) The "direct cost" = $100\% - 19.5\% = 80.5\%$
- c) Direct cost for each item is the total cost of those item x 0.805.

Direct cost of bush clearing item is = $\text{US\$ } 2,772 \times 0.805 = \text{US\$ } 2,231$.

- d) Repeat the calculation process of c) for all of other work items. Enter the result from the calculations of each work item into column (5) of the **Diagram 02** below
- e) The summary of column (5) is the total **direct cost** of the project. i.e.

Direct cost for the project= US\$139,138 x 0.805= US\$ 112,006. And

the in-direct cost that you need to consider (10.5%), ie supervision cost and company cost = US\$ 139,130 x 0.105 = US\$ 14,609 (this cost should be distributed equally for each month till end of the project)

From the example above, you understand that you have **direct costs** (for activities and labour wages etc) and **indirect cost** (supervision and company cost) that have to be paid regularly (monthly) during the rehabilitation project. It is extremely important to make sure that the amount of cash you have available is sufficient to cover your direct and indirect costs each month. You will not be able to continue the work or making work progress without securing this amount.

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Table below shows you that the direct cost of each month need to be spent.

CASH FLOW - Plan for Year 2015													Diagram - 02					
No.	Description	Works		Direct cost 80.5%	Jun-15		Jul-15		Aug-15		Sep-15		Oct-15		Nov-15		Dec-15	
		Unit	Contract price. \$	0.805	1	2	3	4	1	2	3	4	1	2	3	4	1	2
1	2	3	4	5	6		7		8		9		10		11		12	
1	General item	Ls	3670	2954	985	985										985		
	ROAD WORKS																	
2	Bush cutting, grass clearing and grugbing	m ²	2,772	2231	1116	1116												
3	Cut to spoil-soft soil	m ³	4,625	3723		1241	1241	1241										
4	Cut to spoil - soft rock	m ³	1,200	966			483	483										
5	Levelling from cut	m ³	7,033	5662			1887	1887	1887									
6	Fill for leveling from borrow within 150 m	m ³	5,532	4453				1484	1484	1484								
7	Fill to form camber from borrow within 150 m	m ³	9,620	7744						2581	2581	2581						
8	Gravel surface (12-15 cm)	m ³	23,726	19099									6366	6366	6366			
9	Penetractraction Macadam	m ²	14,300	11512											5756	5756		
10	Stone masonry lined drain (1,050m)	m ³	33,150	26686			4448	4448	4448	4448	4448	4448						
11	Gabion	m ³	5,400	4347			543	543	543	543	543	543	543	543				
12	SLAB CULVERT (11 locations)	No	19,118	15390		1710	1710	1710	1710	1710	1710	1710	1710	1710				
13	DRIFT (1)	No	8,802.00	7086							1181	1181	1181	1181	1181	1181		
14	Project sign boards	No	70	56												56		
15	Guide posts installation and paining	No	120	97												97		
	Total direct cost			112,006														
16	Supervision cost (6.5%)+office cost (4%)			14,609		2435		2435		2435		2435		2435		2435		
TOTAL WORKS			139,138	126,615														
Progress made biweekly in amount (US\$)					2,101	7,486	10,312	14,231	10,072	13,202	10,463	12,898	9,801	12,236	13,303	10,509		
Cash out- Plan to spend(US\$)							9,587		24,544		23,274		23,362		22,036		23,812	
Commulative cash out (US\$)							9,587		34,131		57,405		80,766		102,803		126,615	

1.3 Calculating cash flow-out for a project

The diagram 2 above shows the cash flow-out per work item on a bi-weekly basis. If your project is small you can prepare the diagram on a weekly basis that gives more detail, but for larger projects you should prepare this diagram on a monthly basis.

Column: 1, 2, 3 and 4.	Contain information obtained from the calculation of “amount of the project cost”. This information is taken from BOQ in the contract document. The total cost of each item and total contract cost (project cost) is shown in column 4.
Column 5.	the DIRECT COST of each item does not include supervision cost and company cost. The process of calculating is described in Chapter 2.2 above
Column 6-11	The result of the calculation of the direct cost for each work item and indirect cost (supervision cost and company cost divided equally for every two weeks for the duration of the activity).

- ✓ You now continue to calculate direct cost for every two weeks (biweekly) and then calculate direct cost of each month for each work item.

Look at the above example of work item 2, “bush cutting and grass clearing” the total direct cost is USD 2,231 and duration of the work is one month. The direct cost for two week is $USD\ 2,231/2 = \text{US\$ } 1,115.5$. Insert this amount equally over the diagram 2 in the column (6).

- ✓ Repeat the same exercise for other work item in column (6,7.....11) for every month until the end of the project. Now you have direct cost of each work item and the direct cost has been distributed for every two weeks in the plan.
- ✓ Next step is to look at total Monthly/biweekly direct cost. From the above example for the month of June 2015 :

- for the first 2 weeks of June, the work items that are in progress: item 1. General item and item 2, bush cutting and grass clearing item. Total direct cost of the first 2 weeks is: US\$ 2,101.
- For the last 2 weeks of June there are 4 work items in progress i.e: work item 1 and 2 continue, and new work item 3 (cut to spoil soft soil), and item 12 (culvert construction) start in the second half of June.



- Note: Row 16 in the Diagram is “supervision and company cost” which is part of the In-direct cost. This cost is to be spent monthly at end of each month. This cost is calculated as below:

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Supervision cost is 6.5 % of direct cost and office cost of 4 % of direct cost. Total is 10.5 % of the direct cost = US\$ 111,206 x 0.105 = US\$ 14,609.

- The supervision cost and company cost is divided equally for six month (duration of the construction is 6 months) so each month

$$= \text{US\$ } 14,609 / 6 = \text{US\$ } 2,435$$

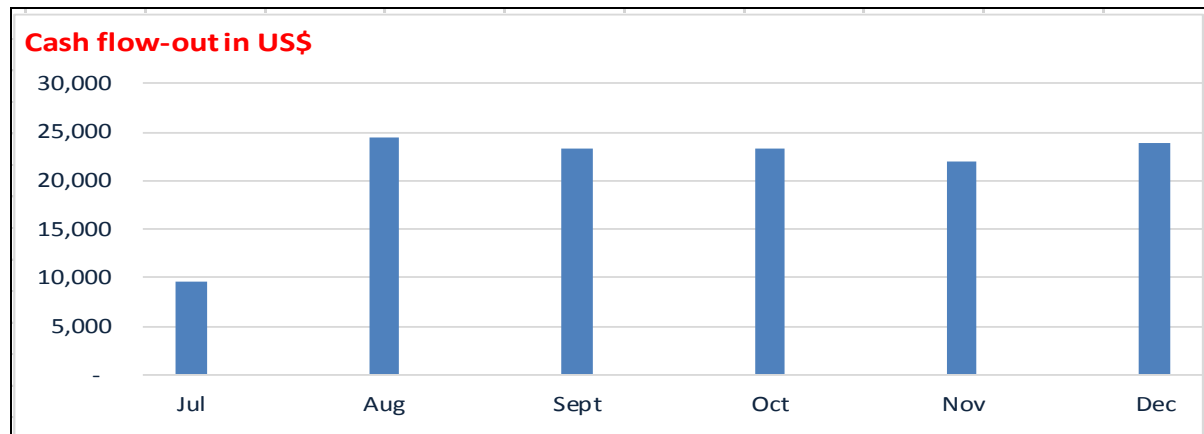
- Total direct cost + supervision and company cost of the last 2 week of June 2015 is

$$= \text{US\$ } 7,486.$$

- The above calculation must be repeated for each column (7, 8, 9, 10 and 11) for every two weeks until the end of the project.

CASH FLOW - PLAN FOR Year 2015												Diagram - 03														
Description	Jun-15				Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Dec-15	
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
2	6				7				8				9				10				11				12	
Progress made biweekly in amount (US\$)	2,101		7,486		10,312		14,231		10,072		13,202		10,463		12,898		9,801		12,236		13,303		10,509			
Cash out- Plan to spend(US\$)					9,587				24,544				23,274				23,362				22,036				23,812	
Commulative cash out (US\$)					9,587				34,131				57,405				80,766				102,803				126,615	

- ✓ **The above diagram 03** tells you that, at the second week of June 2015 you need to spend US\$ 2,101 in order to achieve the planned progress. Till end of June 2015 you need to spend US\$ 2,101+ US\$ 7,486 = **US\$ 9,587**.
- ✓ Payment for the labour cost, supervision cost, material and rental of equipment should be made as soon as possible after they have incurred, and latest before the end of the following month. In this exercise we assume that the contractor makes these payments within two weeks, after receiving payment from the client.
- ✓ You will based on this process need to pay for the costs incurred in June = US\$ 9,587 before the mid of July.
- ✓ Repeat the same exercise for the other months until column (12) in the Diagram 03. The cumulative total you need to pay by the end of November 2015 is **US\$ 126,615**.



The above diagram tells you that the cash you have to pay out at the start of your project, your cash flow-out, is quite small but will increase significantly from the second month (August) then stay relatively constant till the end of the project (December).

Note of the cash flow-out

The more accurate and realistic your cash flow plan is the better it can help you to prepare your cash for the construction work. If you have more than one project ongoing at the same time, you should prepare individual cash flow plans for each one following the same process as described above..

Once you have prepared the calculation of cash flow-out for all the projects you will be able to combine them and have a clear idea about the cash you need each month for payments.. Then you will be able to control your cash for your business and able to plan your payment claim from the client.

1.4 Cash flow-in

The Cash flow-In here is the cash you can claim for the output of works that you have completed. Remember that in many construction projects, including government contracts for rural road construction, you can only claim payment for your work that has been completed and approved by the client. You might agree with the client on the monthly payment for the ongoing work. When you prepare your cash flow plan/ forecasting your cash flow-in you should follow the same schedule as your plan to bill your completed work. In **chapter 7** you will learn how to calculate your payment claim and payment procedure.

Depending on the client, payment for a civil work contract is commonly divided into different phases as described below:

- a) **Advance payment from client:** In many construction projects, the client may allow an advance payment, at the start of the project, which will vary depending on the client's policy, but sometimes could be as much as 20% of the contract value. This advance payment allows you to mobilize the work and make some payments for necessary material delivery and rental of equipment. The advance payment should usually be repaid back during the course of implementation, often in proportion to each progress payment (Interim Payment).

CASH FLOW - PLAN FOR Year 2015												Diagram - 04															
Description	Jun-15				Jul-15			Aug-15			Sep-15			Oct-15		Nov-15			Dec-15		Remarks						
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		1	2				
2	6				7				8				9				10				11				12		13
Progress made biweekly in amount (US\$)	2,101		7,486		10,312		14,231		10,072		13,202		10,463		12,898		9,801		12,236		13,303		10,509		Retention 10%		
Cash out- Plan to spend(US\$)					9,587				24,544				23,274				23,362				22,036				23,812		
Commulative cash out (US\$)					9,587				34,131				57,405				80,766				102,803				126,615		
Cash in(US\$)			13,914		7,113				21,973				20,715				20,793				19,479				21,249	13,903	
Commulative Cash in(US\$)			13,914		21,026				42,999				63,714				84,507				103,986				125,235	139,138	

Based on the above in Diagram 03 above, we now include an advance payment of 10% of the contract amount, which in our case is US\$ 13,194. In this case we look at the follow **Diagram 04** , which show the cash flow in for the different months, starting with the advance payment, interim payments until the final payment.

You can see that at the start of the project, in June 2015, you will receive the advance payment from the client of 10% of the contract amount, i.e. US\$ 139,138 x 0.10 = **US\$ 13,194**. Since you will only make the first payment in July, your cash balance at the end of June is the same as your advance, ie US\$ 13,914.

- b) **Interim Payment from client:** The interim payment is normally paid based on the progress you have made on your work. Generally, from the amount claimed as the interim payment, there is usually a deduction for retention, which is an amount withheld by the client until the end of the defects and liability period (often 10%) and a deduction for repayment of the advance payment (often in proportion to the claim).

Repay retention: From the total claim of your completed work, you need to subtract a certain percentage of your retention (e.g. if your retention is 10% so each progress payment you need to subtract 10% of the amount calculated for your completed work). The Retention amount will be kept by the client as a guarantee that the works have been completed as it should. Half of the retention will be released when the contractor has received certificate of work completed and the balance will be paid after the defects liability period (during this period you are responsible for any defects that may occur as a result of substandard materials or poor workmanship. The length of this period is stated in the contract, and is often 3-6 months in smaller construction contracts).

Remember that it takes time to process a claim (it is important that you find out how many weeks the client normally will need to process your claim). If you expect to receive your payment in July you need to submit your payment claim in June (or even earlier) to allow the client enough time to process the claim. In this example at end of June 2015 your progress is 6.4% as shown in **Diagram 01 (actual measured completed work)** So your payment will be calculated as follow:

- ✓ Total invoice amount: US\$ 139,138 x 6.4%= US\$ 8,890

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- ✓ Deduction of retention 10%= US\$ 8,890 x 0.1= US\$ 889.
- ✓ Deduction of advance payment in proportion to the progress = US\$ 13,914 x 0.64=US\$889.
- ✓ Total amount to be claimed=US\$8,890 – US\$ 889 – US\$ 889 = US\$ 7113

Note: Although these certificates are related to works completed during June 2015, we know that we will not receive the payment immediately. When will it be? To answer this question you have to read the contract. However, even if the contract conditions requires the client to make the payment within one month of your claim submission, you should anticipate that it can be later and you should also allow for delay during bank transfer etc. Some clients are very slow in making payment. In such cases you must follow up regularly up with the client, and inform the client the impact on the work, including possible delays.

In our example, the claim we submit is for work completed by the end of June 2015, with a progress of 6.4%, but payment is only expected to be released two week later, in second week of July 2015. So your cash flow-in in early July is:

$$\text{US\$ } 13,914 + \text{US\$ } 7,113 = \text{US\$ } 21,026$$

However, by the second week of July 2015, you have to make payments for costs that incurred in June. Based on Diagram 04 the total cumulative required cash-out is US\$ 9,587. After making payments your balance will be:

$$\text{US\$ } 21,026 - \text{US\$ } 9,587 = \text{US\$ } 11,439$$

Since the cash-out is more than the cumulative cash-in we will have a negative balance in our cash flow. The total deficit (shortage cash) is US\$ 17,363 - US\$ 19,899= - **US\$ 2,536**.

Repeat the exercise for the other months until December. Your result is shown in the Diagram 05 below.

Description	Jun-15				Jul-15			
	1	2	3	4	1	2	3	4
2	6				7			
Progress made biweekly in amount (US\$)	2,101		7,486		10,312		14,231	
Cash out- Plan to spend(US\$)					9,587			
Commulative cash out (US\$)					9,587			
Cash in(US\$)			13,914		7,113			
Commulative Cash in(US\$)			13,914		21,026			
Commulative cost deviation(US\$)			13,914		11,439			

CASH FLOW - PLAN FOR Year 2015												Diagram - 05															
Description	Jun-15				Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Dec-15		Remarks
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
2	6				7				8				9				10				11				12		13
Progress made biweekly in amount (US\$)	2,101		7,486		10,312		14,231		10,072		13,202		10,463		12,898		9,801		12,236		13,303		10,509		Retention 10%		
Cash out- Plan to spend(US\$)					9,587				24,544				23,274				23,362				22,036			23,812			
Commulative cash out (US\$)					9,587				34,131				57,405				80,766				102,803			126,615			
Cash in(US\$)			13,914		7,113				21,973				20,715				20,793				19,479			21,249	13,903		
Commulative Cash in(US\$)			13,914		21,026				42,999				63,714				84,507				103,986			125,235	139,138		
Commulative cost deviation(US\$)			13,914		11,439				8,868				6,309				3,740				1,183			- 1,380	12,523		

In Diagram 05 above, we can see that in December:

- ✓ You have received a total amount of **US\$ 125,235**, which is your payment for 100% works completion, which is the total contract amount of your project less 10% retention that has been deducted by the client (will be paid to the contractor once the retention and liability period has been successfully completed).
- ✓ By December your cumulative cash flow-out (amount to be paid) is **US\$ 126,615**.

Therefore, in December, your cash flow situation is negative. Your cash flow-in is less than your cash flow-out or $US\$ 126,615 - US\$ 125,235 = -US\$ 1,380$. So you have shortage of cash of US\$ 1,380 (which will be turned into profit once you receive your defects and liability payment)

Release of retention amount:

The retention amount (the money withheld by the client, usually 10% of the total contract sum) will be released after you have successfully completed the defects and liability period (you are responsible for the works during this period). The length of the defects and liability period depends on nature of the project and depends on client's policy, and range from 45 days to 1 year. The retention, the amount withheld, is released when you have repaired any defects of your completed work that occurred within the defects and liability period.

If you look at the above example, at end of December 2015 you still have a negative balance even though you have completed the works. Where is this money? A fairly big amount (usually 10% of the total contract sum) has actually been retained as guarantee. If your work has successfully passed the defects and liability period, then the retained amount will be released. In our example the retention amount is **US\$ 13,903**. **However at the end of completion you have a negative balance of -US\$ 1,380**. Your profit for completing this contract is $=US\$13,903 - US\$ 1,380 = US\$ 12,523$ **this is your profit !!!**

1.5 Analyse cash flow

It is very important to have cash at hand, especially when the project is still ongoing.. To avoid the issues of low cash flow, you should investigate options like: (i) loan or borrow from other financial sources (ii) to reduce your activities until you receive next payment. However, reducing the activities would be a risk since the provision of your contract has set

a deadline, and reducing activities will make it even more difficult to complete the work within the set timeframe.

The cash flow analysis provides information on how much work needed, by calculating future need for cash. Cash Flow analysis is a projection plan on how you expect money to flow into a project (income) and out of project (cash-out) per month during the period of the project. The cash flow analysis also tells you how much surplus or shortage of cash in each month.

The above **Diagram 05** tells you that start from the month of July 2015 till November 2015 the amount that you received from the client for your completed works is not enough for spending. Meaning that cumulative of Cash flow-in is smaller than total cumulative of cash flow-out. In December you have a **shortage of US\$ 1,380**.

How can you solve the problem of this shortfall in order to have enough cash complete your work as planned?

Below are some recommendations to help you solve a low or even negative cash flow:

- a) Requesting interim payments more frequently can reduce the amount of shortage. e.g: instead of requesting interim payments on a monthly basis you might need to request biweekly interim payments. However too frequent requests are difficult to manage as each request involves quite a lot of paper work.
- b) If you have your own capital (based on this example you need at least US\$ 2,000) you will be fine with the current payment arrangement, i.e. requesting interim payment on a monthly basis.
- c) If you do not have your own capital to cover this shortfall, you might need to negotiate a loan from other financial source or you may not be able to complete the work.
- d) Some clients allow advance payment up to 20% of the total contract amount. In such case, the risk of a cash flow shortfall may be reduced.
- e) If your payment process is delayed, longer than in the example above, you will face problem of cash flow if you do not have your own capital. In such situation, you need to secure finances from other sources, eg through a bank loan.

In any case, you MUST NOT reduce your progress of work

When to submit your payment

In the **Diagram 06** below shows relation between the work progress and the payment plan. The diagram 06 tells you when you should submit your payment request based on your work progress.

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CASH FLOW - PLAN FOR Year 2015													Diagram - 06														
Description	Jun-15				Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Dec-15		Remarks
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	
2	6				7				8				9				10				11				12		13
Progress made biweekly in amount (US\$)	2,101		7,486		10,312		14,231		10,072		13,202		10,463		12,898		9,801		12,236		13,303		10,509			Retention 10%	
Cash out- Plan to spend(US\$)					9,587				24,544				23,274				23,362				22,036				23,812		
Commulative cash out (US\$)					9,587				34,131				57,405				80,766				102,803				126,615		
Cash in(US\$)			13,914		7,113				21,973				20,715				20,793				19,479				21,249	13,903	
Commulative Cash in(US\$)			13,914		21,026				42,999				63,714				84,507				103,986				125,235	139,138	
Commulative cost deviation(US\$)			13,914		11,439				8,868				6,309				3,740				1,183				- 1,380	12,523	

Submission payment invoice	Advance	IPC1		IPC 2		IPC 3		IPC 4		IPC 5		IPC 6
Monthly progress (in %)	6.39		19.74		18.61		18.68		17.50		19.09	
Cumulative progress (in %)	6.39		26.12		44.73		63.41		80.91		100.0	

From the above example the Diagram 06 tells you that:

- ✓ By the end of June your work progress is 6.4 %. You can prepare your Interim Payment Certificate 01 (IPC 01), which should be 6.4 % of your total contract amount. Total net payment for IPC No 01 is US\$7,113 (after the deduction of 10% of retention and proportion of advance payment). This amount is released in the first half of July (if your client can process your claim within two weeks).
- ✓ By the end of July your work progress is 19.74 %. You can prepare your Interim Payment Certificate No 02 (IPC 02). Total net payment for IPC 02 is US\$21,973 (after the deduction of 10% of retention and proportion of advance payment). This amount is released in the first half of August.
- ✓ Continue the same exercise for the month of August, September, October and November as shown in **Diagram 06**.

What will happen with your cash if your progress of work is not according to the plan

A civil work construction project should ideally be completed as planned, but sometimes the work will be completed later or earlier than planned. This depends on many factors such as management, availability of workforce, quality and availability of resources like qualification of your staff and quality or availability of equipment. Most of these issue can be controlled by the project manager or the director of the company.

If your project completed as planned the contractor will get profit more or less as your cash flow plan. What will happen if the project progress is slower than plan and the project completed late ??

Look at our example as show in the work schedule below (**Diagram 07**)

In the work item 13 “construction of drift”. The plan is to complete the work in three months. The work on the drift is planned to start in September and to be completed in November. But in the actual fact, the work on the drift started one month late, that is in

October instead of September. The drift is then completed in December instead of November. The **Diagram 07** shows that in September your progress in plan is **63.4 %** but as resulted from the delay of starting the drift your progress is actually only **61.3 %**. **How can you correct this/what can you do ?**

- (i) You might need to increase your progress in October and November to catch up the total work progress i.e the item 13 Drift construction is originally planned to be completed in three months, but if you could increase the resource to finish the drift in two month instead of three months then you can complete the drift construction in November. So all your construction work activities are still completed in November as planned.
- (ii) Do nothing, accept the delay, the work will be completed in December instead of complete in November. This means that your project will be completed one month later (in December). The total duration to complete the contract (all work activities) is 7 months whilst the plan to complete the contract was only 6 months.. The implications of the delay of one month is as follows
 - ✓ You need to pay your supervisors and office rent one extra month. Instead of paying for six months you now need to pay for seven months. The extra supervision cost and office cost is **US\$ 2,435** per month. If you delay your completion work for 2 months the extra cost of the supervision and office cost increased to double that is **US\$ 4,835**. This amount is deducted from your profit. **The longer to complete the work the less profit you will make.** In fact, if there is a prolonged work delay you will lose money.
 - ✓ The defects and liability period is counted from the day of the entire work completed. If the completion of your work is delayed the release of the retention amount is also delayed. If you have borrowed money to finance your project you will keep on paying interest to the bank. .
 - ✓ Many clients include penalties for delayed completion. e.g. some contracts stipulate that 0.2% of the contract sum will be deducted each day of delay counting from the date of ending of your contract.
- (iii) If you finish your work one month early instead of six months you complete your work in five months then case you will save your supervision cost and office cost for one month = **US\$2,435** added to your profit.

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Contractor's Work Programme for the rehabilitation of a road work

Diagram - 07

No.	Description	Works				Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Progress %			
		Unit	Qty.	Bid price. \$	%	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4				
1	General item	Ls	1	3670	2.6	1.76						0.88				
	ROAD WORKS												100			
2	Bush cutting, grass clearing and grubbing	m²	15,400	2,772	2.0	1.99										
3	Cut to spoil-soft soil	m³	925	4,625	3.3		1.11	2.22								
4	Cut to spoil - soft rock	m³	75	1,200	0.9			0.86					80			
5	Levelling from cut	m³	815	7,033	5.1			3.37	1.68							
6	Fill for leveling from borrow within 150 m	m³	575	5,532	4.0			1.33	2.65							
7	Fill to form camber from borrow within 150 m	m³	1,000	9,620	6.9				2.30	4.61			60			
8	Gravel surface (12-15 cm)	m³	1,125	23,726	17.1					11.37	5.68					
9	Penetration Macadam	m²	500	14,300	10.3						10.28					
10	Stone masonry lined drain (1,050m)	m³	325	33,150	23.8			7.94	7.94	7.94						
11	Gabion	m³	80	5,400	3.9			0.97	0.97	0.97	0.97		40			
12	SLAB CULVERT (11 locations)			19,118	13.7		1.53	3.05	3.05	3.05	3.05					
13	DRIFT (1)			8,802.00	6.3						2.11	2.11	2.11			
14	Project sign boards	No	1	70	0.1	Original plan to start here. But actual work start 1 month late				1 month late of completion				0.05		20
15	Guide posts installation and painting	No	4	120	0.1							0.09				
TOTAL WORKS				139,138	100.0											
Monthly progress (in %)						6.4	19.7	18.6	16.6	17.5	19.1	2.1				
Cumulative progress (in %)						6.4	26.1	44.7	61.3	78.8	97.9	100.0				

Original work schedule

Monthly progress (in %)	6.4	19.7	18.6	18.7	17.5	19.1		
Cumulative progress (in %)	6.4	26.1	44.7	63.4	80.9	100.0		

Chapter 2: Manage your finance

Manage your finance refers to the administration of the different incomes and expenditures of your project or business under one or more specific contract(s). It is important to ensure that the incomes are used in such a way as to be able to cover the different expenditures throughout the duration of the contract. This is primarily the responsibility of the director and office administration staff, but the field engineer should try to become familiar with the financial management of the work under his/her responsibility.



It is important that the financial transactions are properly recorded in an orderly fashion in a cashbook (record book). In the cashbook or record book the income is written on one side of the book and outgoing payments are written on other side.

Managing your finances properly from the start of running a project or business is very important. If you lose control over the money going out and coming in to your business or project in the beginning, it will be very difficult to regain that control later. Without proper management of your finances, the risk of business failure increases.

2.1 What is Financial Management

Financial management of your business or project(s) has many aspects. Some large companies run entire departments with several employees to manage their finances. For your purposes as a civil work construction business, it is enough to do three things if you want to manage your finances. You should:

- ✓ Maintain a record book (cash book)
- ✓ Make a monthly profit and loss statement (Make monthly cost comparisons of your actual expenses and your cash flow plan.)
- ✓ At the end of the completion of your work you need to compare your loss and profit statement.

2.2 The record book (cashbook)

The record book is where you write down all the transactions in your business or your project(s). A transaction is the cash-in and cash-out of your specific contract if the money comes in and goes out of the business through transactions.

Record Cash-In: Money that comes in for a road contract that you are implementing is from your client. The money comes in for this work categorize as: (i) Advance payment, (ii) Interim Payment(s) can be 1 or 2 or more payment(s), (iii) practical completion payment and, (iv) Final payment. Details of this payment or Cash in **Chapter 1.4 and Chapter 7.**

Every payment released needs to be recorded in your cashbook in the cash-in column. This allows you to know when and how much cash is coming in. **Record Cash-Out:** Money goes out of a business, for the construction project money goes out for purchasing of materials, payment to labour, payment for rental of equipment, staff salaries, office cost, etc. In your record book you write down how much money was paid out for your business and for what project. If you have more than one project you might need to have individual record book for each project or otherwise you need to insert a new column to record your project number. Accurate records help you to find out if your business is doing well or bad.

In your record book you should write down how much you spent for each item of the expenses and how much you have received from your client. On the right hand side of the record book, you should also describe the category of your expenditure: e.g. spent for labour cost, material cost, equipment cost and spent for other cost as indirect cost.

The example below shows how you should record your cash-in from advance payment of the beginning of your project to mobilize your work. The cash in is recorded in the left column. You spent your advance to purchase some material and to pay labour to mobilize and start your work (direct cost), this is recorded as cash out in the right column.

- ✓ 01/06 you receive advance payment USD 10,000
- ✓ 05/06 paid to cement USD 2,000
- ✓ 07/06 paid rent truck USD 1,000
- ✓ 10/06 paid to labour USD 1,500

RECORD BOOK									Table -01				
Date	Details	Voucher No	Cash (US\$)			Bank (US\$)			Cash out (US\$)				
			In	Out	Balance	In	Out	Balance	Labour	Material	Equipment	Staff salary	Office cost
1-Jun	Balance B/F				0								
1-Jun	Receive advance payment		10000		10000								
5-Jun	Paid cement			2000	8000					2000			
7-Jun	paid rent truck			1000	7000						1000		
10-Jun	paid labour			1500	5500				1500				
Total			10000	4500	5500				1500	2000	1000		

The record can assist you and tell you that:

- ✓ You have received US\$ 10,000 on 1 June as advance payment. You total have spent from 1 June to 10 June is US\$4,500 so your balance is US\$ 5,500.
- ✓ The record tells you that you spent US\$ 1,500 on labour cost, US\$ 2,000 on material cost and US\$ 1,000 on equipment cost.
- ✓ From this record you should be able to assess if your balance is healthy or not, and whether your cash balance is enough to continue your work for next month or not. If not you should start identify the problem and resolve the problem accordingly. You can also make decision whether you should request for another interim payment (remember you can only request another payment if you have made progress that can be claimed).
- ✓ Failure of recording the transactions accurately might lead you to lose control of your finances and not being able to manage the project.

2.3 Monthly cash record

The monthly cash record is the summary of you actual cash record (cash in and cash out). The monthly cash record should be prepared end of each month by summarizing your record book. The monthly cash record tells you the total actual expense compared to your cash-in for each month and you can also compare the monthly actual record to your cash flow plan. You should record the form as follow:

- ✓ From your record book select payment of each category like Labour, material, equipment, staff salary that you have spent during the month. Summarize for each expense for each month and record in the monthly record form
- ✓ Record all cash in that you have received from your client.

Compare your expenses to the cash flow plan:

- ✓ If your actual monthly expense is higher than the cash flow plan and progress of work made less than the plan this mean you lost money. In this case you need to find out reason of the loss.
- ✓ If your actual monthly expense is lower than your cash flow plan and progress of work made same as plan this mean you make good progress / profit.
- ✓ This needs to be control each month

Once you have completed your project you need to:

- a. Summarize your total spent for direct cost (labour cost, equipment cost, material cost).
- b. Summarize total spent for your staff salary (supervision cost)
- c. Summarize total spent of company cost (electricity, phone bill, stationary, your secretary salary, part of your salary,). Some have more than one project, in this case your company cost should share equally to other project as well.

- d. Total amount you have received from your client
- e. **Your loss / profit = $d - (a+b+c)$** , if the result of the equation is positive then you have made a profit but if the result is negative then you lost money.

MONTHLY CASH FLOW RECORD											Table -02		
Details		Year 2014							Year 2015				Total
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
CASH IN (US\$)	Cash in from Advance payment												
	Cash in from IPC												
	Cash in from Retention payment(Final payment												
	Total Cash in												
CASH OUT (US\$)	Labour cost												
	Material cost												
	Salary for supervision staff												
	Retal of equipment												
	Operation and maintenance cost of equipment												
	Mobilize/Demobilize of equipment												
	Hand tools/Safety gears												
	Company cost(stationary, electricity, phone bills....)												
	Any other cash out												
	Total Cash out												
	Cash at end of the month												

2.4 Account records for labour sub contracting and Customer's account record

Business transactions need to be recorded in a form that is easy to follow and use for financial management. Some time you have made sub-contract for part of the work to local community sub-contractors (boron-boron): eg a group of workers is sub contracted to construct a stone masonry lined drain or concrete culvert which is very common in Timor Leste. You need to record properly all transaction in support of your financial management. Make sure that you document your transaction in writing. You can either issue a receipt or alternatively keep a daily cash record of all transaction. The following table can be used to record the payment made for sub contracting of a job. If you have more than one sub contract you need to have one form for each individual sub contract.

Table 3

Accounts Record for Labour cost sub contracting							
Sub-contractor:.....							
Address:.....							
Telephone:.....							
Date	Details Item	Quantity	Amount in the agreement	Amount paid	Balance	Signature of Sub contractor	Signature of main contractor
16. May	Labour sub contract of lined drain	500m	\$ 3,500.0		\$ 3,500.00	Mary Lij	San Sopheak
25. May	First payment			\$ 1,000.00	\$ 2,500.00	Mary Lij	San Sopheak
15. June	Second payment			\$ 2,000.00	\$ 500.00	Mary Lij	San Sopheak
25. June	Final payment			\$ 500.00	\$ -	Mary Lij	San Sopheak

The above table tells you also the agreed amount of a sub contract and tells you each payment released to your sub-contractor. Once all the payment has been released both parties need to sign to acknowledge the payment has been released by the main contractor and received by the sub-contractor. From this record you can avoid further argument between the two parties.

Other record for purchasing construction material to support to your construction work you need to record in a systematic way. Every time that you purchase the material from a shop for a specific project you need to keep a receipt from the shop. At the end of each day you need to fill in the Record Book by using:

- ✓ The receipts, invoices and other vouchers you got when you paid out money to others. Make sure that you get a receipt each time you pay out money!

Sometimes, you need to pay your suppliers on their open bills only at the end of the month (or when you received money from the client). This arrangement is very common in your construction business. For instance if you need to buy cement, gabion basket, steel bars.....

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You will only make payment for this material when you have received payment from the client. If you deal with this situation you should keep a separate account record. Normally this separate "Customer Account Record" should be prepared by the suppliers and a copied received will be kept by you to support to your cashbook.

Example of customer's accounts record for purchasing construction material as below:

Table 4

Customer's Accounts Record							
Shope owner:.....							
Address:.....							
Telephone:.....							
Credit limit:.....							
Date	Details Item	Quantity	Credit purchasing	Amount paid	Balance	Signature of supplier	Signature of customer
16. May	Cement	100 bags	\$ 500.0		\$ 500.00	Mary Lij	San Sopheak
18. May	Steel bars	1000 kgs	\$ 1,200.0		\$ 1,700.00	Mary Lij	San Sopheak
25. May	Gabion basket	100 pcs	\$ 3,500.0		\$ 5,200.00	Mary Lij	San Sopheak
1. June	Payment made			\$ 5,000.00	\$ 200.00	Mary Lij	San Sopheak

The above "Customer Account record" form tells you amount that you still need to pay and amount that has been paid and balance to be paid to the suppliers. For every payment to the supplier you need to record the amount in your cashbook.

2.5 Other financial record.

Training module on "Preparing reading account", "Record of profit and loss account", "Balance sheet", "Financial statement" and "Financial statement analyse" sessions have been developed and is in used by IADE for Business Management Training. These training material will be used for theses session.

Chapter 3: Costing Plant and Equipment

Equipment and plant is important for a road construction project. Even a labour-based road project cannot be completed without some basic construction equipment. The basic equipment for a labour based road construction project consist of: (i) roller (can be pedestrian roller), (ii) dump truck, (iii) concrete mixer, (iv) water bowzer etc. The number and type of plant and equipment depends on size and nature of the project. In some cases the small business owner do not own equipment. In some cases they are part owner of equipment. Most common however is that they rent the equipment on a needs basis. In all cases the equipment must be managed properly.. No matter how good the equipment is if you fail in managing them properly. Either the equipment is not fully utilized or lifetime of the equipment will be shorten. In the end, mismanagement of equipment will be extremely costly for your business.

3.1 Calculate and Save

Plant and equipment are expensive. You should know how to calculate plant and equipment costs so as to save money. Before deciding whether to buy or hire plant and equipment, ask yourself three questions:

- ✓ What do I really need?
- ✓ Is the equipment available for hire at a reasonable cost?
- ✓ What can I afford to buy?

As a labour-based road contractor you must have access to a certain amount of plant and equipment. Before deciding to buy a piece of equipment, it is a good idea to first work out probable running costs, and compare them with what it would cost to hire. Your decision on whether to buy or hire a specific item of plant should be based on a balanced decision where all relevant considerations are thoroughly considered and weighed together.

3.2 Plant Operating Costs

Cost record

The cost of operating plant and transport has to be charged to different jobs they are used on. This means keeping separate cost records for all major items of plant, and also separate out different cost headings. These cost headings should include:

- ✓ depreciation
- ✓ licenses and insurance
- ✓ fuel and lubricating oil
- ✓ repairs, replacements, maintenance, overheads
- ✓ profit

Two of these points, "depreciation" and "repairs, replacement and maintenance" probably need some clarification before we start to calculate the operating costs of, for example, a pick-up truck.

3.3 Depreciation

Depreciation is a way of changing an asset into a series of annual expenses. At the end of the asset's life, the total of the annual expenses is equal to the original cost of asset. Let us use the following example to illustrate the meaning of depreciation.

You have bought a truck and will depreciate it in your book-keeping, the rate of depreciation is constant over the expected lifetime of the truck. This is not the only model of how an asset loses its value over years but it is a very useful and simple method that often illustrates the decline in value sufficiently accurately.

Truck cost is \$50,000 Expected life 5 years residual (rest) value in the end of the fifth year is \$20,000. The depreciation cost $30,000/5 = \$6,000$ per year

We can say : At the end of year 1 the truck is worth \$44,000 at the end of year 2 it is worth \$38,000 and,.... at the end of year 5 it is worth \$20,000

If there had been no inflation, you would then be able to take out this money and buy a new truck. In practice inflation is quite significant in many countries, and businesses have to retain some of their profits if they are going to maintain the real value of their assets. You also have to remember that the estimated lifetime of an asset for depreciation purposes is only an estimate. If the asset is misused or not properly maintained, it will wear out more quickly. If you take good care of it the actual life may be extended well beyond its theoretical working life and your profits will be boosted during these "bonus years". Since you do not have to set aside money for depreciation after its theoretical working life, that margin can be used to increase your profit without charging more.

3.4 Repair, replacement and maintenance

The cost for repairs, replacement of parts and maintenance are difficult to estimate. With new plant you only need to spend a certain amount on regular maintenance. A simple method is to calculate it as a percentage of the yearly depreciation. In the case of your truck, we allow 20 per cent (a figure often used by experienced contractors) of the \$6,000, i.e. \$1,200 per year for repair, replacement and maintenance. You should base your calculation on your experience and the advice received from the equipment supplier.

3.5 Hourly basic cost

We calculate the basic cost of the truck, i.e. what it costs when standing idle in our yard in table below:

Hourly basic cost: For the truck the yearly cost are:

Depreciation	US\$ 6,000
Repair, replacement and maintenance	US\$ 1,200
License and Insurance	US\$ 300
Total	US\$7,500 per year

We will use the truck virtually every working-day, so we must calculate how many working weeks there are per year?

We estimate the time off-work to be:

Holiday periods 2 weeks

Total breakdown 2 weeks

Total maintenance period 2 weeks

Together 6 weeks

The truck work only: $52 - 6 = 46$ weeks in a year

Base on a 44 hours working in a week ie. $= 46 \times 44 = 2,024$ hours in a year

Hourly cost is : $US\$ 7,500 / 2,024 = US\$ 3.7$ per hour

3.6 Operational Cost

In addition to the basic costs we will also have the costs for actual running the truck, that is driver and the fuel needed to run it plus overheads and a profit if we are renting it out to another contractor.

Hourly operational cost	
Daily cost of driver	US\$ 7
Daily cost of fuels and oil	US\$ 30
Total cost	US\$ 37
Total cost per hour $37 / 8$	US\$ 4.6
Add hourly machine cost	US\$ 3.7
Add 10% of overhead cost (0.1×8.3)	US\$ 0.83
Add profit 5 % (0.05×9.13)	US\$ 0.46
Total hourly cost	US\$ 9.59

This is the hourly cost we would charge against the jobs or contracts that the truck worked on. Our truck will probably work on more than one job during the day, so it is convenient to have an hourly rate which includes the cost of driver and fuel. In the case of plant/equipment, such as concrete mixers which stay a long time on one job, it is easier to have a daily rate for the machine, and to charge for the operator and fuel separately.

Chapter 4: Material purchase and inventory

4.1 Materials Purchased

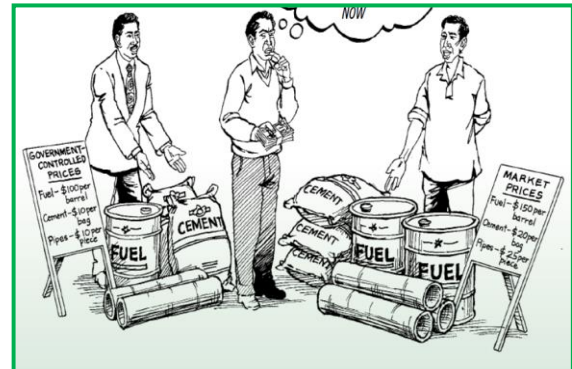
Materials for the rural construction are mainly construction material like: cement, stone, sand, steel bars, gabion baskets etc. It may be make sense to buy materials in advance if they are offered at discounted price or if they may be difficult to find later on. On many contracts they represent the biggest cost item, and small saving through better purchasing or reduced double handling and wastage can make all the difference between profit and loss.

4.2 Waste

One of the responsibilities of site management is the control and storage of construction materials. There is always some wastage of materials. Experience shows that it is not unusual for wastage to amount to as much as 10 per cent of materials used like sand, stone, crushed aggregate, cement etc. On some projects, materials can make up two-thirds of the total cost, so that wastage significantly influences the profitability of a construction project.

The main causes of wastage and loss are:

- ✓ Faulty workmanship or bad quality control, resulting in demolition and rebuilding of substandard work,
- ✓ Orders not clear about quality, quantity or size (receiving the wrong materials or wrong quantities)
- ✓ Excessive use of concrete (e.g. in bedding and haunching pipes)
- ✓ Faulty concrete weight-batcher, producing mixes that are too rich
- ✓ Substandard materials, e.g. poor quality or faulty tolerances resulting in excessive projects
- ✓ Breakage's, e.g. loading, transit or offloading, faulty handling and incorrect methods of assembly
- ✓ Faulty storage resulting in site or weather damage especially for storage of cement. (look at LBT technical manual)
- ✓ short deliveries
- ✓ Wilful damage due to malice
- ✓ Pilferage, theft and corruption



4.3 Checking Up

There are three ways to find out how much money you are losing because of damage and deterioration of materials:

- ✓ looking carefully around the site and checking through the site stores usually shows

examples of poor placing and storage of the materials like cement, steel bar, fuel, hand tools.

- ✓ comparing figures given in orders, receipts and issues, and checking on remaining stocks, check the store stock record, check the fuel distribution record
- ✓ measuring the work done and calculating the materials used.

4.4 Inventory Record

Contractors should maintain inventory records for all equipment, furniture, office supplies, construction tools and materials. Any movement, such as new purchase or receipt should be recorded in an appropriate inventory control form. For example if it is the new purchase then it should have an supply Receipt Note and if it is a transfer from one site to another, complete an Equipment Delivery and Transfer Note.

Inventory of Tools and Materials

Proper inventory records for all kinds of tools and materials should be maintained by the contractor or her/his staff at each office or site. Stores administration procedures are enumerated below(all formats are attached in [Annex:16](#)):

- ✓ Receipt of tools and materials Complete an Equipment/Supplies Receipt Note.
- ✓ Issue of tools and materials Complete an Equipment/Supplies Requisition and Issue Note.
- ✓ If the contractor or her/his staff find some tools or materials broken then this should be recorded also on a Broken/Damaged Items Record and entered into the Stores Ledger.
- ✓ For all transfers of tools and materials from site to the store, an Equipment/Supplies Transfer Note should be completed. Such transfers should also be recorded into the Stores Ledger.
- ✓ A monthly or quarterly Stock Report should be prepared by the staff of the contractor as deemed necessary. Information for the Stock Report is obtained by closing the Stores Ledger and transferring the carried forward balance to the respective column of the Stock Report.
- ✓ After preparing monthly stock report, a new Stores Ledger should be opened and all closing balance on the monthly stock report are to be recorded as opening balance.

Inventory of Small Equipment and Office Furniture

For small equipment and furniture a separate form is recommended to be used as such equipment and furniture are not regular moving items. The contractor should advise her/his staff to maintain such record. The inventory list for small equipment and furniture should include inventory number, item name, quantity, cost, purchase order number/voucher no and other relevant information like location etc. Each small equipment and furniture item should be marked with inventory number.

Chapter 5: Personnel Management

Personnel management is an important task for staff in charge of a civil construction works project or applying labour-based work methods for rural road work. As opposed to the management of equipment, labour issues are seldom the reason for delays on projects. When building rural roads, projects employ different categories of personnel, ranging from technical and administrative staff to artisans (skills workers) and unskilled workers. A small number is permanently (long term contract) employed while others are engaged on a temporary basis. When applying labour-based works technology, a large majority is recruited on a casual basis for the duration of the work activities as manual labour.

5.1 Long term contract Staff (or permanent staff)

The contractors employ personnel on a permanent (long term contract staff) basis in order to provide a certain level of continuity in their work programmes. Permanent/long term contract staff fill such posts as:

- ✓ engineers, technicians, site supervisors, equipment operators (e.g. truck drivers, roller operators, etc...)
- ✓ office staff such as accountants, clerical staff/admin assistance

When the contractors face an increased workload, they usually engage more staff. At first, they may engage the additional personnel on a contract basis, normally linked to the duration of the civil works contracts to which they are assigned.

When these firms eventually increase their work levels on a more continuous basis, the contractor normally takes on some of the temporary contract staff as long term or permanent employees of the firm. Conditions of employment vary from company to company, but the conditions of employment should be clearly agreed at the time of recruitment, to avoid any misunderstandings or grievances at a later stage.

Any large companies will seek to utilize to the extent possible the staff already in their employment, so the project manager or company director may have to accept staff assigned to the project by higher level management.

Staff performance usually improves if the project management has the authority to dismiss or return unsuitable personnel. Most projects operate against demanding production targets and strict control requirements, so the skills and dedication of project personnel is vital for the timely progress of work.

5.2 Casual Labour

Casual labour for the labour based road work refers the unskilled and skilled workers that are employed on a needs basis. To ensure that there is a sufficient supply of workers, it is important to plan the recruitment well in advance. The local villagers need to be given notice about the future labour requirements of the project. They also need notice so that they can plan and organise their regular commitments and work activities, such as farming and household activities. They can then set aside sufficient time to participate in the road works. The announcement should be widely and publicly available, in Tetun and state (for

more details of the employment of labour, reference is made to the Manual of Labour-Based Technology for rural road works):

- ✓ date, time and place of recruitment,
- ✓ conditions of employment,
- ✓ daily wage and payment arrangement
- ✓ type and purpose of work, and
- ✓ who is eligible for work.

The majority of labour based work activities should be timed to periods of the year when labour availability is good, such as during the agricultural slack season. When announcing the employment opportunities in the nearby villages, it is important to stress that both men and women are eligible to apply. Persons below the legal working age should not be recruited. If there is a surplus of labour applying for work, a ballot system can be used to make sure that the recruitment is fair and gives an equal chance for all applicants. During recruitment, it is important that the workers are fully informed about the conditions of work, i.e. working hours, the wage amount and when it will be paid, period of employment, entitlements and general discipline on the work site. To ensure the required level of effectiveness on the work site, serious attention should be given to the motivation of the labour force. This is ensured by various measures such as appropriate wages, proper work organisation and supervision, secure working conditions, timely payment of wages and the use of incentive schemes.

5.2.1 Recruitment and management of casual labour

Recruitment of casual labourers should be done about one or two weeks before starting of actual work. The workers should be recruited from people living in the communities in the vicinity of the road to be constructed.



The contractor is responsible for the recruitment of the workers and to follow the employment laws of the country and employment clauses included in the contract. The contractor should coordinate with local authority especially with the Suko Chief and the Sub-district Administrator for recruitment arrangement. A meeting, explaining the objectives of the activity and conditions of work, should be held with the community in the presence of the Suko Chief and Sub-district Administrator. The meeting should provide the information on:

- ✓ Type of work to be carried out.
- ✓ Recruitment process, and that labourers should offer his or her services voluntarily
- ✓ Number of labour to be recruited, and the time and place of recruitment
- ✓ Employment duration and other conditions of work

- ✓ Women and men are equally eligible and welcome to seek employment
- ✓ Minimum working age, and that school must be a priority for young people
- ✓ Wage payment based on task system, timing and arrangement for payment and payment method, stressing equal payment for women and men for work of equal value.
- ✓ Safety and health regulations to reduce the risk of injury and sickness related to the work place,
- ✓ Offered wage
- ✓ Responsibilities of the community and the workers

This is important in order to avoid possible accusation of corruption practice. Each casual worker should be registered. A requirement of the project is that the contractor provides same opportunities for women to work as for men. In practice this means, that half of the workers should be women as long there are sufficient numbers of interested and available female workers who fulfill the general criteria for work. However, at least minimum of 30% of the workers should be women.

Labour should be recruited step by step according to the plans and work requirement. The table below shows an example of the labour recruitment planning.

No.	Activities of works	Step of labour recruitment					
		WEEK-1	WEEK-2	WEEK-3	WEEK-4	WEEK-5	WEEK-6
1	Bush cutting, grass clearing and grubbing	10	10	10	10	10	10
2	Cut to spoil-soft soil		10	15	15	15	15
3	Levelling from cut			10	15	15	15
4	Excavation of side drain				15	15	15
5	Fill for leveling to form Camber					15	15
6	Labour sub contract for drainage structure				5	5	5
	Total labour per week	10	20	35	60	75	75

It is important to train workers on the job at the beginning of implementation to make sure that they fully understand the work system, work procedures and the task work approach. It is an advantage to keep workers for a longer period of time as they will have learnt on the job making supervision easier.

5.2.2 Incentive payment system

In order to achieve the planned work in labour-based road construction works, it is necessary to motivate and encourage the labourers by giving incentives. Incentive can vary from one to the other project. The incentive can be payment in kind, cash payment, provision of food or a mix of food and cash payment. However, it is recommended to provide cash as the incentive in labour-based work to achieve the desired productivity. There are three basic cash payment incentive schemes in use the labour based road construction and maintenance works, as presented in the table below.

Incentive Schemes for Labour-based Works	
Daily Paid	<p>Workers are paid an agreed sum of money for each working day in return for a fixed number of hours.</p> <p>This system is sometimes used in labour-based road construction for activities which are difficult to quantify. e.g. watering activity, workers who follow the roller during compaction to fill low spot that appear during compaction, etc.</p>
Piece Work (also known as boron-boron)	<p>Workers are paid a fixed sum of money per unit of output. The daily output is usually left to the discretion of the workers. Through this system workers can earn more money by increasing daily output.</p> <p>This system requires good control by the supervisors in order to achieve quality of the work as the workers are trying to product more output and paying less attention to the quality of work or safe working practices. For the labour based road construction works, this system is good for some activities, which require less number of worker such as construction of culverts, excavation foundation of bridge, etc.</p> <p>The boron boron system is commonly used in Timor-Leste. Under this system, a group of people, usually led by a skilled worker, will carry out a defined quantity of work, eg construction of a culvert, construction of a stone masonry drain etc, to an agreed cost. It is very important that there is an agreement on the amount and timing of payment and also that the contractor closely checks the quality of works.</p>
Task Work	<p>Workers are paid an agreed daily wage in return for a fixed quantity of of work, so called daily task. Workers are free to go home as soon as the given task has been approved. Individual or group tasks can be given.</p> <p>The most successful of the labour-based road construction project have been the organized using the task work system. The task work system is therefore usually recommended for labour-based road construction works. Advantages of the task work system for the labour based road construction works include:</p> <ul style="list-style-type: none"> ✚ Planning of the work is simple because the output per workday is known; ✚ A higher output than with daily work is achieved because the workers know their task and value the extra free time they are getting; ✚ Supervision is easier because each worker knows very well what to do. The workers are eager to finish work early.

5.2.3 Task rates (work norm)

The task rate (or work norm) is the quantity of work to be completed by one labourer (or a group of labourers) for one day works to satisfactory quality.

The task rate for the road work activities vary depending on many factors, like geometry, general condition at the particular location, type of soil, etc. In Timor-Leste, based on experiences from previous labour-based road project, task rates have been established for each activity of the road works. These task rates should however be reviewed for each new construction project and also from time to time. Sample task rates of road construction activities in Timor-Leste in **Annex 19**

There can be circumstances when the average rates given cannot be applied because of special conditions on a site. In such cases, the task rates should be adjusted. This will allow the labor force to get used to the tools and the activity. Also, during these first few days, the workers and work conditions can be studied so that a correct task rate can be found.

A correctly set task should allow 70% of the workers to finish their day's work in approximately 75 per cent of the normal daily working time. The other 15% of workers can finish the work a bit faster and the rest 15% complete a bit later. Or the majority of the workforce should be able to complete the works in around 6 hours whilst some will take longer and some will be faster.

5.2.4 Payment of workers

The Muster-payroll is a ledger in which the presence or absence of each worker is noted daily. It forms the basis for the pay-roll and is thus a very important document. No erasure or alterations should be made, however, if alterations prove necessary they should be certified by the Engineer, who should put his/her signature on the place where the alteration has been made.

The Muster-payroll should be prepared and updated daily by the Supervisors. The Muster-payroll needs to be checked by the Engineer and Approved by the Director of the Company before the payment claim is submitted. Workers will sign on the Muster-payroll when receiving their payment.

Payment of wages in full and on time to the workers is one of the most important aspects of labour-based work implementation.

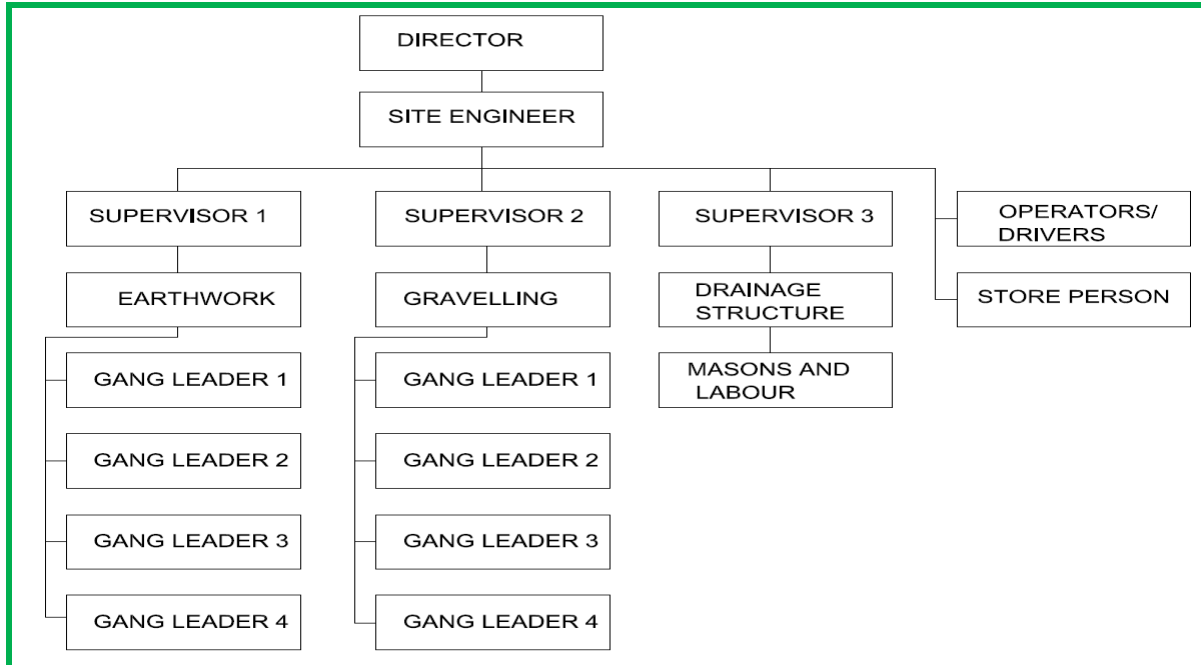
The contractors should clearly explain the amounts to be paid and the process for wage payments before the works start. It is essential to make payment to the workers in the correct amount, on time and at location and date agreed with the community, usually near the road project.

Payment to the workers should be made on a fortnightly or monthly basis. Payment should be always made directly to the worker who conducted the work, not to any other party. This means that payment should not be handled through Chief of Suko, nor should it be paid to any representative of the worker. However, the Contractor shall inform the client and local authorities before any payment is effected, and it is advisable to have the Chief of Suko sign on the Muster-payroll to avoid any future disputes. Adequate security arrangements must be put in place when handling payment to the workers.

5.3 Organizing field staff and casual labour for a labour-based rural road construction

A labour-based road construction project, with up to as many as 100-150 labourers and a work site that is several kilometres long, needs to be planned and organised carefully. Otherwise it is impossible to ensure high productivity from each labour work gang and an efficient use of each piece of equipment.

Organizing workers for the labour based road construction is a crucial task for the site engineers and site supervisors. Work organisation is to arrange and distribute works between the gangs of workers in such a way that the best use is made of available labour, materials and tools. To effectively manage the labour it is recommended to have a site management structure as shown in the organization chart below:



For the effective management of the labour, one supervisor should not manage more than four gangs of workers and each gang of workers should select one work gang leader to supervise the gang of workers. Selection of women gang leaders are encouraged, as they from experience are more diligent than their male counterparts. 50% of the total number of gang leaders should be women. Each work gang should consist of between 15 to 25 workers. The work gang leaders should also be employed as a casual semi skilled worker. A gang of workers is usually engaged in only one or two difference types of activities for each day. All workers in the gang are assigned to work places close together to ensure efficient supervision and control.

As shown in the above site structure, if a road construction site need to employ up to 200 workers or more, a minimum of three site supervisors should be deployed for supervising the works. Each road construction site should have one Site Engineer. The Site Engineer should take full responsibility for the entire work operation which includes both site administrative matters and technical issues.

For the success of the project, the contractor's director should spend a reasonable amount of time at the site to guide and monitor the site staff. The Director should make sure that the staff and workers have the necessary tools, materials and equipment on site to effectively manage the works. Weekly or bi-weekly meetings should be held with the site staff to ensure effective communication and resolution of any problems. All instructions, both technical and administrative, must be confirmed in writing

5.4 Managing office Staff

A construction company needs to have office staff who are responsible for administrative and financial matter. The number of admin and support staff and the size of the office depends on the operations and scale of your business. Office staff play a very important function in providing logistic support to your project on site. The office staff should at least consist of (i) an admin and finance assistant, and (ii) a store keeper or logistic staff etc. who can help with financial record keeping, , managing all administrative matter, providing logistic support to construction site(s), communication with suppliers or dealers etc. These staff should be recruited as a long term contract staff with the function of supporting the construction activities in field to ensure the field work receive full support without obstruction that could slow down work progress. Office staff should have proper job descriptions so that they can perform effectively.

In some cases you may need to hire outside consultants in order to undertake some specific work tasks or to handle additional work load,. Outside resources like these can free the small business owner from operational work to concentrate on planning and managing the business.

Attracting good employees can be hard for the small firm, which may not be able to match the salaries, benefits, and advancement potential offered by larger firms. To overcome these disadvantages, small business owners must promote employee satisfaction. Comfortable working conditions, flexible hours, opportunities to help make decisions, and a share in profits and ownership are some of the way to do this.

In addition to that, your own role is most important. How you work, how you behave and what you say all give an impression of your company and establish a pattern of behavior for your staff. If you are honest and hard-working, you will attract staff with similar working habits. Take your staff into your confidence, trust them with information and make sure they know about your company's goals, When you recruit new personnel, remember to tell them the features you are proud of, and train them to represent your company in their dealings with others.

When staff perform well you should reward their increased output, not only with a bonus or salary increase but also by recognition, involvement and learning opportunities. Do not hire additional people if you could get along with those working at the moment by reorganizing the tasks. You yourself and all your staff costs must be included in project pricing as indirect costs, which means that the more administration costs you have the less competitive you will be. If your employees are competent and willing to learn, teach them to be polite and positive when talking to customers over the telephone, when writing business letters and when negotiating. This will build up a positive picture of your company. In this section we will deal with some of these matters in more detail.

Chapter 6: Site and office record keeping

Administrative procedures are established on every work site to secure the proper handling of tools, equipment, construction materials, fuel and human resources. These procedures include a management structure, clearly defining the roles and responsibilities of the various staff members assigned to the work site. Good site management is ensuring profit of your project. Good records keeping in the field is important for you to properly manage your site resource like equipment, tools, fuel material etc.

In order to simplify the work, administrative procedures include a number of forms, used on a daily, weekly and monthly basis to report on the use of various resources such as tools, materials, equipment and labour. With clear procedures on how and by whom these forms are filled out, the time spent on administrative matters can be minimized and the supervisory staff can concentrate on managing the actual construction work.

This section is introducing different formats to be used on the road construction site. The administrative forms are introduced below:

- a) **Equipment log book:** To record all movement of equipment and consumption of fuel used plus service detail record. This includes keeping track of all equipment usage details. The form to be used for equipment regardless whether the equipment is rented or owned.

Who and when: The operator must fill and sign the form and site engineer/site supervisor must check daily after the equipment finished the work. The form must be filled daily or whenever the equipment is used. This form is also filled when fuel is distributed for the equipment. Form of the equipment log-sheet is attached in **Annex: 15**

- b) **Fuel stock record:** Fuel includes diesel, gasoline, engine oil, hydraulic oil that is used for equipment on site daily and must be recorded.

Who and When: The store keeper should fill and record when he/she receives the fuel from main supplier and when the fuel is distributed to the equipment operators. Site engineer/site supervisor must check daily at end of each day. The forms should be signed by site engineer/supervisor and sent to the office (admin staff) at the end of each month for office record. Form of the Fuel stock record is attached in **Annex: 13**

- c) **Hand tools record:** Receiving and distribution of hand tool record like: shovel, hoes, pick axes, crow bars, wheel barrow etc must be recorded. The record include new hand tools and the return of broken hand tools. It is to monitor the the loss of the hand tools and knowing when broken hand tools have to be replaced or repaired.

Who and When: The store keeper should record every time when he/she receives the hand tools from a supplier and each tool that is distributed to a labourer. The site engineer/site supervisor must check daily at end of each day. The forms should be signed by site engineer/supervisor and sent to the office at the end of each month for office record and request for new supply hand tools if required. Form of the hand tools record is attached in **Annex: 16**

- d) **Daily site plan and daily report:** The daily site progress report allows the contractor to plan on a daily basis the activities to be carried out, to record the actual achieved quantity of works and to calculate the required input in terms of labour both for road formation works and gravelling. The form has to be filled by the Site Supervisors in charge of the site while the engineer checks/approves it.

The daily reports give information to the Engineer who planned the work. When Engineer has analyzed the figures it should be clear if and why the targets are (not) reached. Either the targets have not been set correctly or the work has not proceeded as planned. With the information of the report, better planning can be done for next day.

An accurate daily report cannot be made unless the Engineer knows very well how the site is organized and what has taken place during that day. Form of the Daily site plan and daily report is attached in **Annex 17**.

- e) **Weekly and Monthly progress report:** The weekly progress report is the summary the information on actual production copied from the Daily Site Report. The Weekly Report is prepared at the end of each week. The Weekly Report contains all activities the Engineer needs to report. Enter the output recorded under "ACTUAL" in the Daily Report into the appropriate columns of Quantity of works and Work Days of each activity and each day in the week of weekly report.

Monthly progress report: The monthly progress report is the summary of the weekly progress report. By end of each month the engineer summarizes the report by using the same form of the weekly progress report that is attached in **Annex 18**. The filled form need to be sent to the office and checked and approved by the director.

- f) **Material delivery record:** To record quantity of the material deliver on site. The form is used to control amount and quality of construction material delivered on site like: stone, sand, crushed aggregate and gravel. An assigned field staff to monitor and receive the material by filling the form for each truck of material delivered on site. This assigned staff shall measure quantity of the material on the truck before delivery and record the quantity and quality in the form. The form to be signed for each truck by the driver and the assigned receiving the material. A signed copy of this form has to be submitted to the office for record. Form of material deliver sheet is attached in **Annex 12**

- g) **Labour master roll:** The muster payroll is the labour record that records the recruited labour and the actual labour attendance. This is the base for labour payments.

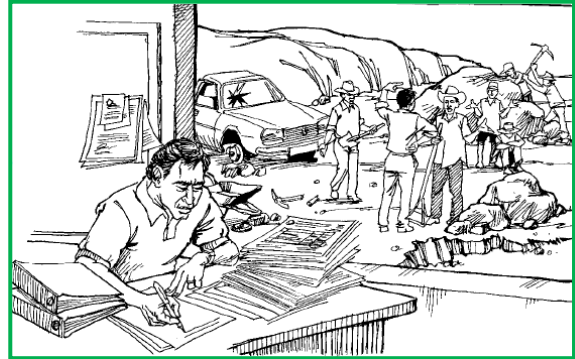
Who and when: The contractor's site supervisor has to prepare the muster payroll on a daily basis. For every payment request a signed copy of this form has to be submitted to the Client together with the payment certificate preferably in a monthly basis, as part of the payment claim by the contractor. The contractor must also ensure that laborers sign for payment received on the muster payroll. This record of the muster roll must be maintained by the contractor's office staff after payment has been made to the labourers.

For Office record keeping session to use IADE's training manual on Manage your construction business

Chapter 7: Payment

7.1 Payment Process

Any payment made for a construction contract to a contractor should be based on completed works, which have been measured and approved by the client's engineer and deemed to comply to the quality listed in the BOQ (in the contract). Under no circumstances shall the contractor be paid for works, which have not been completed or have been carried out to sub-standard quality. During the course of works implementation, it is expected that deviations may occur from the Engineer's estimated quantities.

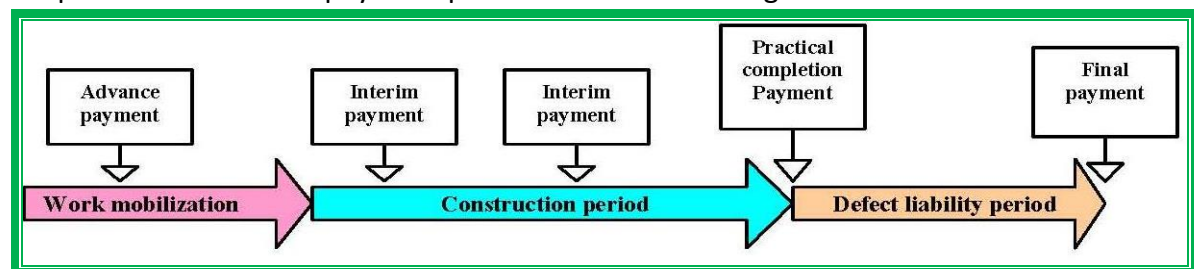


The payments are made based on the actual measured quantities - not the amounts as listed in the Bill of Quantities.

Before the contractor carries out any works, which deviates from the Bill of Quantities and the Technical Drawings, the Contractor needs to obtain written approval for such works from the client's engineer. Payment will not be approved for any additional works, which have not received prior approval from the client's engineer. Payment certificates for a road works contract are divided in difference stages:

- ✓ advance payment,
- ✓ interim payment(s), accompanied with payment break down
- ✓ practical completion payment, accompanied with payment break down
- ✓ final payment.

Graph below shows the payment process in difference stages



7.2 Advance Payment

Advance Payment is made at the contract start in order to give the contractor means to mobilize quickly. It is paid as a percentage of the total contract value. The Advance Payment should be released after the client received security bond (for some client, this

security bond is not required). The amount of the advance payment vary depending on the client with normally ranging between 10-20% of the total contract value.

7.3 Payment Breakdown

The Payment Breakdown form provides the basi for the Interim Payment Certificates and the Certificate of Practical Completion. The payment certificates should always be accompanied by a Payment Breakdown, which provides a detailed record of the works completed and for which payment is now being processed.

When the contractor requests payment for completed works, the client's engineer with the contractor's authorized person need to visit the site and measure the works carried out since the previous payment. Form of payment breakdown is shown below (full form **is in Annex 01**): (the payment break down form specifically under the R4D project is attached in **Annex 09**)

The process of preparing of payment request is shown below:

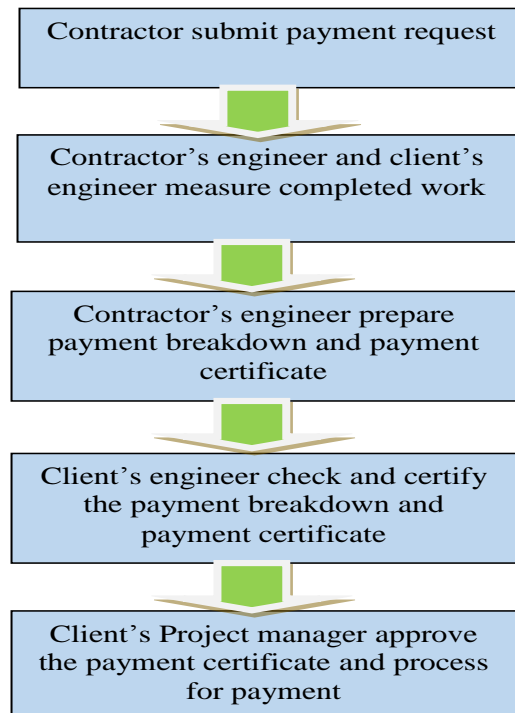


Table below shown sample of payment bread dome form

Item	Description	Bill of Quantities				Previous		This Payment		TOTAL PAYMENT	
		Unit	Quantity	Rate, USD	Total Amount	Quantity	Amount, USD	Quantity	Amount, USD	Quantity	Amount
	I. GENERAL ITEMS										
	II. ROAD WORKS										
2	Site Clearance on Earthwork Sites										
2.1	Bush cutting, grass clearing and grabbing	m ²									
2.2	Removal of Trees dia. 15 - 30cm	no									
2.3	Removal of Trees > 31cm	no									
3	Roadway Excavation										
3.1	Cut to Spoil	m ³									
3.2	Rock Excavation	m ³									
3.3	Unsuitable Material Excavation	m ³									
3.4	Levelling from CUT	m ³									
3.7	Fill to form camber from borrow withing 150m	m ³									
	ROAD PASSING BAY (4 locations)										
3.5	Fill for levelling from borrow withing 150m										
4.1	Gravel Surface (12cm)	m3									
4	Road Surfacing	m ³									
4.1	Gravel surfacing + camber	m ³									
	Total -II ROAD WORKS										

Responsibility: The contractor's engineer is responsible for preparing the Payment Breakdown after inspecting the completed works on site and the client's engineer is responsible for checking and ensuring the correctness of the filled form.

When: The Payment Breakdown is prepared for every payment certificate for which the contractor submits an invoice.

Procedure: The Payment Breakdown is based on the Bill of Quantities, included in the contract agreement. Completed works are recorded in this form in order to calculate payments to the contractor. Payments are based on the agreed rates in the Bill of Quantities and the measured works completed by the contractor.

Bill of Quantity: In these three columns, enter the agreed quantities, rates and total amounts as specified in the Bill of Quantities in the Contract Agreement for each of the work activities.

Previous payment: If any previous payments have been issued under this contract, enter the total quantities and amounts for which prior payments have been made for each of the activities listed. Remember that if several payments have already been done, this column should provide the total quantities and amounts previously paid.

This Payment: in the columns for Quantity and Amount under This Payment, enter the quantities of works completed which is now due for payment, since the previous certificate. The correct amount for payment under each work activity is calculated by multiplying the measured quantity with the agreed rate from the Bill of Quantities.

Total Payment: Summarize the amounts in the third column by adding the quantities and amounts of "Previous Payments" and of "This Payment". Remember that the total quantities and amounts in this column, "Total Payment" should in the end correspond to the amount in the BoQ of the Agreement, unless there has been an approved variation.

Approval: The Payment Breakdown is issued together with the payment certificate. The Payment Breakdown needs to be signed by the Contractor and the Client's engineer and the total under "This Payment" is transferred to the payment certificate as the gross or invoice amount claimed before any deductions are made (see section 7.4 below)..

Note: *It is the responsibility of the client's engineer to ensure that payments are made only for works which have been completed and that completed works are inspected to verify that the works have been completed to the technical standards and quality prescribed in the contract.*

7.4 Interim payment:

The Interim Payment Certificate is based on the Payment Breakdown. The interim payment should be based on completed works that has been measured by volume and recorded in the payment break down. Consequently, the volumes are multiplied with the contractual unit rates and thereby adds up to the payment amount to be claimed by the contractor. The total amount from the Payment Breakdown is then transferred to the Payment Certificate. On the basis of this amount, the percentage of completion can be calculated.

This is however the gross payment claim (invoice amount) and the net payment (the payment that the contractor will actually received) will be based on the gross payment less deductions as outlined below (usually repayment of advance and retention).

The advance payment is repaid on every interim payment until the total advance has been repaid. The percentage repaid is usually based on the percentage of progress made, which means that the total advance will be fully repaid together with the completion certificate..

Retention money is deducted from the gross amount claimed in the Payment Certificate. The retention, usually 10%, is deducted from the invoice amount (not the total contract value). By subtracting the deductions from the invoice amount, the final amount due for payment is calculated.. Finally, for monitoring purposes, retention amount and any previous payments are recorded, together with the total contract value and the remaining contract balance. Form of Interim payment certificate is attached in **Annex: 02** (The Interim payment certificate form specifically under the R4D project is attached in **Annex: 08**)

Responsibility: The contractor's engineer is responsible for preparing this certificate. It should only be prepared after the works for which the contractor claims have been inspected and found in good order, conforming to prescribed quality, and when the claimed quantities have actually been carried out.

When: Interim Payment Certificates are prepared on the request of the contractor, i.e. upon the receipt of a claim ideally on a monthly basis. However, a certificate should only be prepared if it conforms to the agreed payment schedule described in the contract agreement.

Approval: this certificate needs to be signed by the contractor director and certified by the client's engineer and approved by the client's project manager.

Note: Actual payments to the Contractor should be issued by direct bank transfer. Under no circumstances should the contractor be paid in cash.

7.5 Practical completion payment:

The certificate of practical completion is used for processing payment for the last remaining works at the end of the contract. The certificate should be issued based on completed works which have been measured by the client's engineer and the contractor's representative.

After inspection on site in regular manner, providing that the works are found in good order, the contractor is eligible for payment of the remaining works. The date of issue of the certificate of practical completion is counted as the starting date of the defects and liability period.

It is important to keep in mind that:

- ✓ Final deduction of repayment of the advance shall be made in the completion payment certificate (unless the advance has been repaid in full earlier).

- ✓ The retention money withheld, usually 10% of the completed work, shall be kept until the end of the defects and liability period.
- ✓ Performance bond should be released to the contractor after issuance of the practical completion certificate.

Form of Practical Completion payment certificate is attached in [Annex: 03](#).

Responsibility: The contractor shall inform the client that the work has been completed and in writing request a joint inspection of works completion. The contractor's engineer is responsible for preparing this certificate. It should only be prepared after the works for which the contractor claims have been inspected and found in good order, conforming to prescribed quality, and when the claimed quantities have actually been carried out.

When: The Certificate of Practical Completion is prepared only once all works have been completed.

Approval: The Practical payment certificate is accompanied by the Payment Breakdown. This certificate needs to be signed by the contractor director and certified by the client's engineer and approved by the client's project manager. Note, the defects and liability period will start once the completion of works is approved.

7.6 Final payment

Defects Liability Period is normally described in particular condition of contract. The date is counted from issuance of practical completion payment certificate. During this period the contractor shall make good any defects occurring resulting from substandard materials or poor work practices. The contractor shall carry out regular maintenance of the road. During this period the quality of the design and the workmanship by the contractor becomes evident.

The Final Payment Certificate is issued after (i) the defects liability period has expired, and (ii) any remedial works have been inspected and found in good order.

Once payment of the remaining retention money has been made, all obligations from both parties to the contract are regarded as fulfilled. This also constitutes the final completion of the contract. Only at this stage should the retention money be recorded as expenditure.

Form of final payment certificate is attached in [Annex: 04](#)

Responsibility: The contractor shall inform the client that they completed the defects and liability period and in writing request a joint final inspection of the works. The contractor's engineer is responsible for preparing this certificate. It should only be prepared at the end of the defects liability period after the works have been inspected on site and found in good order and conforming to prescribed quality.

When: The Final Certificate of Completion is prepared on the date of completion of the defects liability period as indicated in the Contract.

Procedure: The Final Certificate of Completion is prepared only once for any given contract and only after the defects liability period and final inspection. (i) The amount of retention withheld during the Defects Liability Period should correspond to the figure entered into the Practical Completion Certificate as Balance Due after Defects Liability Period. (ii) Deductions are made for any deficiencies that the contractor has failed to correct after

receiving reasonable notice. . It is important to note that the deductions entered in this form, are final and the Contractor shall have no further possibility to take any remedial action, nor receive any later payments. (iii) If additional time is required to repair deficiencies as instructed by the client's engineer this period may be extended, on the request of the Contractor.

Approval: The Final Payment Certificate needs to be signed by the contractor's director and certified by the client's engineer and approved by the client's project manager before payment is carried out. Once this certificate has been agreed and signed there cannot be any further payments on this contract.

7.7 Handing Over the Works

During the final inspection after liability period, representatives from the client should be present for the formal handing over of the works. After the issuance of the final payment certificate, it is the responsibility of the client to maintain the completed roads or road sections

7.8 Variation of work

In case of the volume of the works and type of the work vary by: making changes to the timing or sequence for part of the Works; Omitting part of the Works; additional work, or Changing the specifications...the client engineer should issue Variation Orders. The total of all Variation Orders must be within the contingency amount for the contract. If the variation cause to increase contract prices beyond the approved contract, the amendment of the contract shall resubmitted for approval before commencing the additional work.

7.9 Summary of the payments

The below diagram interpreted:

- ✓ **Performance bond:** Normally the amount of performance is 2% of the contract value (depends on the client policy). The bond is retained from the start of the contract until the contractor has completed the work. In other words, the bond is retained by the client until the contractor received Practical Completion Payment.
- ✓ **Advance payment.** The full amount of the advance payment is paid to the contractor at the start of the work, upon submission of workers insurance policy and performance bond. The advance payment is repaid in each payment claim and by Works completion the advance payment has been repaid in full.
- ✓ **Progress payments:** Progress payment are made based actual completed works and claimed through Interim Payment Certificates until the completion of the work (the final progress payment is the Practical Completion Payment). The total maximum amount of the progress payment is the total contract amount less the retention amount. In many cases the retention amount is 10% of the total amount of the completed work.
- ✓ **Retention:** The amount of the retention money that is withheld by the client. The accumulate retention amount increases for every progress payment. The retention

amount is usually equal to 10% of total amount of the completed work. This retention amount will be released to the contract after the defects and liability period.

Annex: 02 ERA Interim Payment Certificate

INTERIM PAYMENT CERTIFICATE FOR ROAD WORKS					
Road Name : _____			Contract No : _____		
Contractor : _____			Certificate No: _____		
Address : _____					
Commencement Date: _____			Completion Date: _____		
<p>This is to certify that the road construction works as detailed in the attached Breakdown of Payments and referred to in the Bill of Quantities of the above mentioned Contract have been completed and accepted to the satisfaction of the Project in accordance with the terms and conditions of the Contract.</p>					
1 Invoice Amount		Percentage Complet.		Amount, USD	
Measured Works: (Same as Grand Total in Payment Breakdown)					
Total Invoice amount					
2 Deductions					
Less 10% Retention		(1)X0.1, USD			
Repayment of Advance (proportion of the IPC payment)		USD			
Other _____		USD			
(Specify)					
3 Total Amount Due,		(1)-(2), USD			
4 Detail of previous payments					
a- Cert N°	b- Date	c- %Compl.	d- Wages	e- Amount, USD	Repayment of Advance, USD
Advance					
1					
2					
3					
4					
Total Previous Payments					
5 Contract Value				Amount, USD	
5a	Original Contract Value			USD	
5b	Approved Extra Works			USD	
5	Total Contract Value (5a+5b)			USD	
6 Contract Balance (5)-(4e)-(3), USD					
Works					
Prepared by: _____			Date: _____		
Contractor's director					
Endorsed : _____			Date: _____		
Client's engineer					
Approved : _____			Date: _____		
Project Manager					

Annex: 03 ERA Practical Completion Payment Certificate

COMPLETION CERTIFICATE

Road Name: _____ Contract N°: _____
 Contractor: _____ Certificate N°: _____
 Address : _____

This is to certify that the road construction works at the above mentioned road and as specified in the Contract and referred to in detail in the Bill of Quantities have been completed and accepted to the satisfaction of the Project in accordance with the terms and conditions of the contract.

It is hereby advised that payment is made to the Contractor as follows:

		Amount, USD
1 Remaining Payment of Works:	(Same as Grand Total in Payment Breakdown)	
Measured Works:		
Total Invoice Amount		
2 Deductions:		
Repayment of remaining Advance		USD
Other (specify) _____		USD
3 Less 10% Retention:	(1)-(2)x0.2	USD
4 Total Amount Due:	(1)-(2)-(3)	USD

5 Details of previous payments:

a- Cert No	b- Date	c- % Compl.	Previous Payment, US	e- Retention, kip	Rep. of adv.	Wages
Advance						
1						
2						
3						
4						
5						
Total						

6 Total Retention Monies (3)+(5e), USD

7 Contract Value

7a	Original Contract Value	USD	
7b	Approved Extra Works	USD	
7	Total Contract Value	USD	

8 Balance Due after Defects Liability Period (=amount of clause (6) USD

Works

Inspected by: _____ Date: _____
 Contractor's director
 Endorsed : _____ Date: _____
 Client's engineer
 Approved : _____ Date: _____
 Project Manager

Annex: 04 ERA Final (End of defect Liability) Payment Certificate

DEFECTS LIABILITY (FINAL) CERTIFICATE	
Road Name: _____	Contract N ^o : _____
Contractor : _____	Certificate N ^o : _____
Address : _____	
<p>This is to certify that the construction of road works at the above mentioned road and as specified in the Contract, have been fully completed and accepted to the satisfaction of the Project after inspection following the Defects Liability Period in accordance with the terms and conditions of the Contract.</p> <p>It is hereby advised that payment is made to the Contractor for the remaining retention monies, comprising 10% of the Contract value, calculated as follows:</p>	
1 Retention Monies Withheld:	USD <input style="width: 150px;" type="text"/>
2 Deductions: _____ (specify)	USD <input style="width: 150px;" type="text"/>
3 Total Amount Due:	(1)-(2), USD <input style="width: 150px;" type="text"/>
Amount in words: _____	
4 Date of Practical Completion:	_____
5 Date of End of Defects Liability Period:	_____
<p>Works Inspected by: _____ Date: _____ Contractor's director</p> <p>Endorsed : _____ Date: _____ Client's engineer</p> <p>Approved : _____ Date: _____ Project Manager</p>	

Annex: 05 ERA Labour wage Payment Certificate

WAGES CERTIFICATE			
Road Name: _____	Contract N ^o : _____		
Contractor : _____	Certificate N ^o : _____		
Address : _____			
<p>This is to certify that the construction of road works at the above mentioned road and as specified in the Contract, have been fully completed and accepted to the satisfaction of the Project after inspection following the Defects Liability Period in accordance with the terms and conditons of the Contract. All workers have been duly registered and the payment request below is based on attached signed musterroll.</p>			
No of beneficiaries:	<div style="border: 1px solid black; height: 15px; width: 100%;"></div>		
No of women:	<div style="border: 1px solid black; height: 15px; width: 100%;"></div>	% of women:	<div style="border: 1px solid black; height: 15px; width: 100%;"></div>
Total No of wd:	<div style="border: 1px solid black; height: 15px; width: 100%;"></div>		
Wage payment:	<div style="border: 1px solid black; padding: 2px;">No ____ Period ____ / ____ - ____ / ____</div>		
1 Wage paymentwd x \$.....	USD	<div style="border: 1px solid black; height: 15px; width: 100%;"></div>	
2 Wage paymentwd x \$.....	USD	<div style="border: 1px solid black; height: 15px; width: 100%;"></div>	
3 Wage paymentwd x \$.....	USD	<div style="border: 1px solid black; height: 15px; width: 100%;"></div>	
3 Total Amount Due:	USD	<div style="border: 1px solid black; height: 15px; width: 100%;"></div>	
<p>Amount in words: _____</p> <p>_____</p>			
<p>Works</p> <p>Inspected by: _____ Date: _____</p> <p style="text-align: center;">Contractor's director</p> <p>Endorsed : _____ Date: _____</p> <p style="text-align: center;">Client's engineer</p> <p>Approved : _____ Date: _____</p> <p style="text-align: center;">Project Manager</p>			

Annex: 06 ERA Muster role for labour wage

		Project Code:		<div>Programa Mao de Obra Intensiva</div> <div>Lista Traballador Sira</div>																		
		Distritu: Sub-Distritu																				
		Suko: Aldeia:																				
		Grupo No: Actividade:																				
Data:																		Total Loron	Salariu Loron	Total Salariu		
Naran Kompletu																						
1 ID:																						
2 ID:																						
3 ID:																						
4 ID:																						
5 ID:																						
6 ID:																						
7 ID:																						
8 ID:																						
9 ID:																						
10 ID:																						
11 ID:																						
12 ID:																						
13 ID:																						
14 ID:																						
15 ID:																						
Prepared by:		Title		Assinatura		Data											Total					
Checked by:		Title		Assinatura		Data																

Annex: 07 R4D Summary Payment certificate



ROADS FOR DEVELOPMENT PROGRAM

Interim Payment Certificate No			
(Period: Fromto.....)			
Name of the Road:	District:	Sub district:	Suco :
Contract No. :	Package No:		
Contractor:			
Starting date :	Completion date :		
Defects liability period :			
Contract value USD :	Date of IPC submission: :		
<div style="margin-top: 20px;"> <div style="display: flex; justify-content: space-between;"> 1 Total value of work billed to date \$ </div> <div style="display: flex; justify-content: space-between;"> 2 Previously billed amount \$ </div> <div style="display: flex; justify-content: space-between;"> 3 Actual value of work in this billing \$ </div> <div style="display: flex; justify-content: space-between;"> 4 Deductions: </div> <div style="display: flex; justify-content: space-between;"> A Retention [10 % of item 3] \$ </div> <div style="display: flex; justify-content: space-between;"> 5 Total deduction (A) \$ </div> <div style="display: flex; justify-content: space-between;"> 6 Amount approved for payment [3-5] \$ </div> </div>			
Amount in Words: <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;">Submitted by:</div> <div style="width: 45%;">Checked and Verified by:</div> </div>			
<div style="border-top: 1px solid black; margin-bottom: 5px;"></div> Contractor's Representative	<div style="border-top: 1px solid black; margin-bottom: 5px;"></div> Supervisor Ministry of Public Works	<div style="border-top: 1px solid black; margin-bottom: 5px;"></div> Regional Engineer R4D, ILO	<div style="border-top: 1px solid black; margin-bottom: 5px;"></div> Regional Engineer Ministry of Public Works

Annex: 08 R4D Interim Payment certificate

Interim Payment Certificate No (Period: Fromto.....)											
Name of the Road:											
Contract No. :						Package No:					
Contractor:											
Pay item No.	DESCRIPTION	CONTRACT AMOUNT (\$)	RELATIVE WEIGHTAGE (%)	SUMMARY OF BILLED WORKS						BALANCE OF WORK	
				BILLED WORKS AMOUNT							
				PREVIOUS		THIS PERIOD		TOTAL			
				AMOUNT	%	AMOUNT	%	AMOUNT	%	AMOUNT	%
		(1)		(2)		(3)		(4) = (2) + (3)		(5) = (1) - (4)	
1	General items										
2	Site clearance										
3	Earth work										
4	Road works										
5	Road surfacing										
6	Structural works										
7	Road furniture										
Total											
<p>WE HEREBY CERTIFY THAT THE STATEMENT OF WORK ACCOMPLISHED ON THIS PAGE IS TRUE AND CORRECT.</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 20%;"> <p>Submitted by:</p> <p>_____</p> <p style="text-align: center;">Contractor's Representative</p> </div> <div style="width: 20%;"> <p>Checked and verified by:</p> <p>_____</p> <p style="text-align: center;">Supervisor Ministry of Public Works</p> </div> <div style="width: 20%;"> <p>Checked and verified by:</p> <p>_____</p> <p style="text-align: center;">Regional Engineer R4D, ILO</p> </div> <div style="width: 20%;"> <p>Checked and verified by:</p> <p>_____</p> <p style="text-align: center;">Regional Engineer Ministry of Public Works</p> </div> </div>											

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Annex: 09 R4D Break down Payment Certificate

CONTRACTOR'S STATEMENT OF BILLED WORK																
Pay ITEM NO.	DESCRIPTION	QUANTITY + COST								PROGRESS QUANTITY + COST						
		UNIT	UNIT COST \$	ORIGINAL CONTRACT		VARIATION		REVISED CONTRACT		BILLED QUANTITY			BILLED AMOUNT \$			% BILLED
				QUANTITY	COST \$	QUANTITY	COST \$	QUANTITY	COST \$	PREVIOUS	THIS PERIOD	TOTAL	PREVIOUS	THIS PERIOD	TOTAL BILLED	
				(a)	(b)	(c)	(d)	(e) = (a) + (c)	(f) = (b) + (d)	(1)	(2)	(3) = (1)+(2)	(4)	(5)	(6) = (4) + (5)	
1	General items															
2	Site clearance															
2.1	Clear vegetation	m2														
2.2	Remove trees	No														
2.3	Remove topsoil	m2														
2.4	Grubbing	m2														
2.5	Remove rock from surface	m3														
		Sub total 2														
3	Earth works															
3.1	Cut to spoil - soft soil	m3														
3.2	Cut to spoil - hard soil	m3														
3.3	Cut to spoil - rock	m3														
3.4	Fill from within 30 metres	m2														
3.5	Fill from beyond 30 metres(Transport)	m3														
		Sub total 3														
4	Road works															
4.1	Leveling	m2														
		Sub total 4														
Total in USD																

Submitted by:

Contractor's Representative

Checked by:

Supervisor
Ministry of Public Works

Checked by:

Regional Engineer
R4D, ILO

Verified by:

Regional Engineer
Ministry of Public Works

Annex: 10 R4D Calculation sheet

Calculation Sheet

District:							Item No: 3.1	
Sub district:							Cut to Spoil(Earth excavation) - soft soil	
Suco :								
SN	Chainage		Unit	Measurement details			Total quantity	Remarks
	From	To		L	W & S m2	H		
1	4+115	4+115	M	12	4	0.375	18	Excavation foundation Drift
2	4+240	4+240	M	16	4	0.328	21	Excavation foundation Drift
3	5+660	5+680	M	20	0.5	0.5	5	Excavation foundation R-W
4	4+441	4+479	M	38	0.66		25.08	Digging Side drain
5	4+479	4+609	M	130	0.77		100.1	Digging Side drain and R W
	5+437	5+68.8	M	244	0.66		161.04	Stone lined drain
Total Quantity cut to spoil (soft) m ³							330.22	
Note: Soil Excavation for Stone Lined drain and Stone lined drain and Retaining wall and drift foundation								

Submitted by:

Checked by:

Checked by

Verified by

Luis Adino Cristovao

Contractor's Representative Training Engineer
R4D, ILO

Supervisor
Ministry of Public Works

Regional Engineer
Ministry of Public Works

Annex: 11 R4D Final Payment Certificate/Take over



**REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE
MINISTÉRIO DAS OBRAS PÚBLICAS
SECRETARIA DE ESTADO DAS OBRAS PUBLICAS
DIRECÇÃO NACIONAL DE ESTRADAS, PONTES E CONTROLE DE CHEIAS
Roads for Development Program**



To: XXXXXXXXXXXX
Director,XXXXXXXXXX

Dili, 27 January 2014

Reference: XXXXXXXXXXXX

Re: Taking Over Notice Contract No: XXXXXXXXXXXX

Dear XXXXXXXXX,

On behalf of the Ministry of Public Works (MPW) and the International Labour Organization (ILO), undersigned MPW and ILO Representatives herewith certify that the Company XXXXXXXXXX Unipessoal Lda has completed as of 24 January 2014 works under contract no.xxxxxxxx, on the Road xxxxxxxx as described in Attachment 1.

Following the completion of the works as mentioned in Attachment 1, the contract status of contract no. R4Dxxxxxxx is as follow:

- ☐ Full take-over of works by ILO (in accordance with General Conditions of the Contract, Clause 8.2) and acceptance by MPW. Remaining contractual obligations are mentioned in Attachment 2 to this letter

Read and confirmed on behalf of:

ILO:	Bas Athmer, R4D Chief Technical Advisor	Signature	Date: 27 January 2014
MPW:	Rui Hernani F. Guterres, DRBFC Director	Signature	Date: 27 January 2014
Contractor:	Fernando Manat, Director	Signature	Date: 27 January 2014

Cc: Minister of Public Works
Head of Procurement ILO Geneva
ILO R4D Senior Roads Engineering Specialist
ILO R4D Procurement and Contract Management Specialist

Attachment 1

Completed Works under Contract No. xxxxxxxxxx

Pay items No	Descriptions	Unit	Unit Rate \$	As in Contract		Implementation	
				Quantity	Cost \$	Quantity completed	Payable \$
1	General items						
2	Site clearance						
2.1	<i>Clear vegetation</i>	M2					
2.2	<i>Remove trees</i>	No					
2.3	<i>Remove topsoil</i>	M2					
2.4	<i>Grubbing</i>	M2					
2.5	<i>Remove rock from surface</i>	M3					
	Total						

Attachment 2

Remaining Contractual Obligations under Contract No. R4D/xxxxxxxxxxxxxx

☐ Responsibilities under Defect Liability Period covering the period from 27 January 2014 to 30 June 2013

Read and confirmed on behalf of:

ILO: Bas Athmer, R4D Chief Technical Advisor	Signature	Date: 27 January 2015
MPW: Rui Hernani F. Guterres, DRBFC Director	Signature	Date: 27 January 2015
Contractor: Fernando Manat, Director	Signature	Date: 27 January 20145

Annex: 12 Material delivery sheet

Materials delivery Control Sheet (one control sheet for each truck)								
Contractor: Libra		Contract No: ERA-SC-12-0228		Contract Name: Lauana-Leimea Leten Section 01			District: Ermera	
Sub-contractor: Materials Lda (1)		Material, source (km): Stone, Cailaco River 15km			Planned qty/trip: 2.5 m3		Planned qty per day: 25m3	
Date (fill even if no supply)	Time	Truck dimension (average height of load)			Qty (m3)	Driver Signature	Supervisor Signature	Breakdown Rain, etc
		Length	Width	Height (aver.)				
1-Jul-13	8.3	3	1.5	0.5	2.25	Jose	Andre	
1-Jul-13	10.3	3	1.5	0.4	1.8	Jose	Andre	
1-Jul-13	13.15	3	1.5	0.3	1.35	Jose	Andre	Rain
2-Jul-13	-	-	-	-	-	Jose	Andre	Rain
3-Jul-13	8.3	3	1.5	0.6	2.7	Jose	Andre	
3-Jul-13	10.2	3	1.5	0.5	2.25	Jose	Andre	
3-Jul-13	12.45	3	1.5	0.5	2.25	Jose	Andre	
3-Jul-13	14.3	3	1.5	0.4	1.8	Jose	Andre	
3-Jul-13	16	3	1.5	0.5	2.25	Jose	Andre	
4-Jul-13	8,30	3	1.5	0,5	2.25	Jose	Andre	
4-Jul-13	11	-	-	-	-	Jose	Andre	Breakdown
9 trips/4 days	summary no of trips / no of days				18.9 m3	summary quantity		

Annex: 13 Fuel stock record

REGISTRO BA IHA STOK COMBUSTIVEL

Ba fulan:.....

Estrada:.....

Distrito:.....

Loron/data:.....

<i>Deskrisaun</i>	<i>Transitado</i>	<i>Simu iha fulan ida ne'e</i>	<i>Uza ona iha fulan ida ne'e</i>	<i>Fulan ne'e lakon hira</i>	<i>Transitado ba fulan oin</i>	<i>Remarks</i>
Gazoel						
Gasolina						
Oli mesin						
Masa						
Oli Hydraulic						
Oli Travaun						

Prepara husi official kampu

Verifika husi: Egenheiro de Kampu

Managing Your Road Construction Business

Annex: 16 Tools stock record

Estrada:.....			Distrito:.....			Loron/data:.....	
Deskrisaun	Transitado	Simu iha fulan ida ne'e	Hasai iha fulan ida ne'e	Feramentas ne'ebe at iha fulan ida ne'e	Feramentas ne'ebe lakon ida ne'e	Transitado ba iha fulan oin	Remarks
Ensada							
Kanuru bo'ot							
Karau dikur							
Garfu							
Bow saws							
Baliu							
Katana lere du'ut							
Karosa							
Padiola							
Raga / bote							
Escopu							
File (S)							
File (M)							
Metro bo'ot (30m)							
Metro badak (5m)							
Ranging rods							
Profile boards							
Line levels							
Martelu 1kg							
Martelu 3kg							
Ai-suak							
Ai-suak – 80cm							
Ai-suak – 150cm							
Tali							
String line							
Sharpening stones							
Luvas							
Kanuru bo'ot (belar)							
Kado'o bo'ot							
Bidon							
Bomba mina							
Balde							
Jerigen							
Jerigen rega							
Hand rammers							
Feramentas ulun (pegangan)							
Preapara husi official kampu		Verifika husi: Egenheiro de Kampu					

Annex: 17 Daily site plan

OVERALL / DAILY SITE PLANNING AND ACTUAL RECORD

District:..... Sucu:..... Road Name:..... Length:..... km Weather:.....

PLANNED							ACTUAL / ACHIEVEMENT							Actual norm
ACTIVITIES	Unit	Km-Start	Km-End	Output	Norm	No Labour	ACTIVITIES	Unit	Km-Start	Km-End	Output	No Labour		
1- Earthworks							1- Earthworks							
Setting out	m						Setting out	m						
Bush and grass clearing	m ²						Bush and grass clearing	m ²						
Cut trees & stump removal	no						Cut trees & stump removal	no						
Soil excavation / Cut	m ³						Soil excavation / Cut	m ³						
Leveling	m ³						Leveling	m ³						
Ditching	right	m ³					Ditching	right	m ³					
	left	m ³						left	m ³					
Sloping	right	m ³					Sloping	right	m ³					
	left	m ³						left	m ³					
Forming camber	m ³						Forming camber	m ³						
Embankment / Fill	m ³						Embankment / Fill	m ³						
Excavation of mitre drain	m						Excavation of mitre drain	m						
Watering / compaction	wd						Watering / compaction	wd						
Other							Other							
2 - Gravelling Works							2 - Gravelling Works							
Reshaping subgrade	m ²						Reshaping subgrade	m ²						
Excavation of gravel	m ³						Excavation of gravel	m ³						
Haul gravel by wheelbarrow	m ³						Haul gravel by wheelbarrow	m ³						
Spreading gravel	m ²						Spreading gravel	m ²						
Surface improvement	m						Surface improvement	m						
Watering / compaction	wd						Watering / compaction	wd						
Other							Other							
3 - Structures							3 - Structures							
Culvert construction	No						Culvert construction	No						
Lined drain	m						Lined drain	m						
Retaining wall	m						Retaining wall	m						
Gabion	Box						Gabion	Box						
Supporting & gang leader	wd						Supporting & gang leader	wd						
Total WD							Total WD							
Prepared by:..... Date:...../...../2014							Checked by:..... Date:...../...../2014							
Supervisor							Engineer							

Annex: 18 Weekly and Monthly report

WEEKLY/MONTHLY SITE REPORT

District:

Sucu:

Road Name:

Length:km

DATE		Month:2013										Total this month				
ACTIVITY	Unit	qu-ty	Wds	qu-ty	Wds	qu-ty	Wds	qu-ty	Wds	qu-ty	Wds	Chainage		Total		
												Start	End	Quantity	Wds	
1- Earthworks																
Setting out	m															
Bush and grass clearing	m ²															
Cut trees & stump removal	no															
Soil excavation / Cut	m ³															
Leveling	m ³															
Ditching	right	m ³														
	left	m ³														
Sloping	right	m ³														
	left	m ³														
Forming camber	m ³															
Embankment / Fill	m ³															
Excavation of mitre drain	m															
Watering / compaction	wd															
Other																
2 - Gravelling Works																
Reshaping subgrade	m ²															
Excavation of gravel	m ³															
Haul gravel by wheelbarrow	m ³															
Spreading gravel	m ²															
Surface improvement	m															
Watering / compaction	wd															
Other																
3 - Structures																
Culvert construction	No															
Lined drain	m															
Retaining wall	m															
Gabion	Box															
Supporting & gang leader	wd															
Total WD																
Prepared by:..... Date:...../...../2014												Total Wds:				
Supervisor												Male:				
Checked by:..... Date:...../...../2014												Female:				
Engineer																

Annex: 19 Sample task rates for Labour-based road construction

TASK RATES FOR LABOUR - BASE ROAD CONTRUCTION					
Activity	Unit	Task Rates			Recommend ed work system
		Condi - I	Condi - II	Condi - III	
Setting out of road alignment include road cross section	M/wd	50 - 100			Daily work. Team of 3 skills worker
Bush Clearing include disposal of cleared material out of clearing width	M ² /wd	300	350	400	Task work or small group task (max 5 workers)
Grubbing include disposal of grubbed material out of clearing width	M ² /wd	50	75.0	100.0	
Grass Clearing include disposal of cleared material out of clearing width	M ² /wd	80	100.0	120.0	
Tree and Stump Removal include disposal of tree and stump out of clearing width	No/wd	1.0	2.0	3.0	
Top Soil Removal include disposal of spoil material out of clearing width	M ³ /wd	3.0	4.0	5.0	
Excavation(cut) to spoil include throw the exceeded material out of road formation	M ³ /wd	1.5	2.0	2.5	
Excavation (cut) and fill include spread and level the material	M ³ /wd	1.2	1.5	1.8	Task work or small group task (max 5 workers)
Excavation and fill from borrow (within 30 m) include spread and level the material	M ³ /wd	1.1	1.3	1.5	
Excavation and fill from borrow (within 30-50 m) include spread and level the material	M ³ /wd	1.0	1.2	1.3	
Excavation (cut) of side drain and form Camber	M ³ /wd	1.1	1.3	1.5	
Soft rock Excavation	M ³ /wd	0.8	1.0	1.2	
Forming Camber use material from borrow	M ³ /wd	1.1	1.3	1.5	
Slopping (back slop and front slop) include spread the cut material for road formation	M ² /wd	40.0	50.0	60.0	
Planting Grass	M ² /wd	11.0	13.0	15.0	
Excavate gravel and stock pile	M ³ /wd	1.1	1.3	1.5	
Load gravel on a truck (4 m ³ truck)	M ³ /wd	4.0-4.5			

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<i>Gravel Spreading</i>	M ³ /wd	4.0	4.5	5.0	
<i>Condition - I : Hard soil, Hard gravel, Hard Rock, Bush, Heavy vegetation and grass cover etc.</i>					
<i>Condition - II : Firm Soils, Medium condition of rock, gravel, bush, vegetation and grass cover etc.</i>					
<i>Condition - III : Sandy soils, loose rock, loose gravel, normal condition of bush, vegetation and grass cover etc.</i>					

TASK RATES FOR DRAINAGE STRUCTURE				
<i>Activity</i>	<i>Unit</i>	<i>Proposed norm in Range</i>	<i>Recommended work system</i>	<i>Remarks</i>
Construction stone masonry head wall, wing wall and abutment wall of culvert include prepare mortar, haul and pointing.	M ³ /wd	0.7- 1.0	Piece work	Min. Team: 1 head mason, 3 helpers
Construction stone masonry lined drain and retaining wall include prepare mortar, haul and pointing	M ³ /wd	0.7- 1.0		
Construction of concrete work for culvert and small bridge include mixing, hauling, placing and curing	M ³ /wd	0.5-1.0		Min. Team: 1 head mason, 5 helpers
Dry stone pitching include prepare base and place stone	M ² /wd	4-8		Min. Team: 1 head mason, 3 helpers
Bend, place and fix steel bars	Kg/wd	100-150		Min. Team: 1 skill bar bender, 2 helpers
Gabion work: Prepare base, fix gabion box, place stone	M ³ /wd	1.5 - 2.0		Min. Team: 1 skill, 2 helpers
Construction scour check include collection of stone and stick	No/wd	4 - 6	Task work	
<i>Note: The realistic task rates within the given ranged has to be decided upon based on site conditions</i>				

Annex: 20 Sample Service Agreement for field staff

COMPANY LETTER HEAD

EMPLOYMENT CONTRACT - PROJECT ENGINEER	
Employer	Employee
Company Name:[insert company name]	[Insert name of the employee]
Office address:[insert address]	Home address:[insert address]
Phone No:[insert phone no]	Contact No:[insert phone no or email address]

Description of the assignment

[insert name of employee] is employed as the Contractor's Project Engineer for the road rehabilitation works on road [insert road name], in [insert district, sub district]. The work is the management of work activities as specified below in obligations of the Engineer.

Conditions of Work

The employment will initially be for [insert no of months], from [insert start and end date] and is thereafter expected to be extended for the duration of the Project.

Work hours are 8-17 Monday to Friday and 8-12 on Saturday, except public holidays. The employee shall be present on the work site every day.

The employee will receive a salary of [insert amount] on the [insert date] of each month, subject to submission of monthly site progress reports and attendance.

The employee will be provided a motorbike for supervision (to be used for work only)

In addition to the salary, the monthly payment includes a pre-paid telephone card for communication [insert monthly amount]. Fuel for the motorbike will be provided by the company based on motorbike logbook, for approved usage only and to a maximum amount of [insert amount per month].

[Provision of accommodation - insert if applicable]

[Health and Accident insurance - insert if applicable]

[Incentive - insert information if applicable]

Obligations of the employee [add/delete as applicable]

- A. The Project Engineer will plan, organize supervise, and coordinate all road construction activities and supervise all field staff including company supervisors, plant operators and site store keeper. He/she will report directly to the director of the company
- B. The Project Engineer will be based in the field near above mentioned road. He/she will spend full time in the field to manage the work. A motorbike will be provided by the company to allow the Project Engineer to move along the identified project sites. However he/she will travel to Dili as requested by the Director for meetings with the Client, tentatively once a month.
- C. The Project Engineer shall perform for the work described in detail below:
 - 1) Prepare detailed work plan for the completion of above mentioned road work;
 - 2) Coordinate with local authority for recruitment of labour and identification material sources for the road construction work;

- 3) Coordinate and cooperate with client's engineer in all aspect of the road construction activity, including identification of suitable materials for road construction and drainage construction;
- 4) Organize labour, task works and sub-contracts for work such as construction of stone masonry drain, gabion work, culvert construction, etc;
- 5) Plan, organise and manage all inputs in a cost effective manner, including materials, tools and equipment including equipment hire agreements and other sub-contracts, etc;
- 6) Supervise and assist site supervisors to organize the labour for road work. Assist the supervisor to set out rod alignment and set out elevation of drainage structures;
- 7) Control quality of the road work and drainage structure work performed by labour and sub-contractors;
- 8) Monitor work progress compared to work plan and identify areas of weakness for improvement;
- 9) Monitor compliance with (i) environmental issues (ii) gender aspects (iii) occupational safety and health;
- 10) Check daily site planning/reporting, weekly reporting that prepared by supervisors. Prepare monthly planning as well as physical progress report for Director on monthly basis;
- 11) On a daily basis check labour muster roll, fuel consumption of the equipment. On a daily basis control material delivery on site and work performed by equipment in site such as rollers, excavator and trucks;
- 12) On a weekly basis check site store include fuel stock record, equipment logbook and hand tools record;
- 13) Organize and lead weekly site meeting with all site staff to ensure progress and quality of the work;
- 14) Measure and prepare payment claim of the completed together with the Director;
- 15) Assist Director and Site Supervisors with payment of labour;
- 16) Address to the extent possible disciplinary issues on site;
- 17) Together with the client's engineer assess and prepare quantities for extra works;
- 18) Undertake any other activities relevant to the assignment, as instructed by the Director.

Obligations of the employer

the Employer shall provide overall guidance and direction for the work;

The Employer shall provide the necessary input for the timely implementation of project activities, including sufficient supervisory capacity, materials, equipment and labour;

The Employer shall provide Motorbike and Fuel for the supervision;

The Employer shall pay on time and in full.

Legal Issues

[The Employer shall provide the Employee with a staff health and accident insurance.] The Employer will not be held responsible for any expenses relating to accident, illness, injury or death, whether this to be incurred in the services covered by this Contract or not.

Any conflicts that may appear during the execution of this contract will be resolved by mutual agreement between the two parties. In case failing to reach an amicable solution, the issue will be submitted to the proper Timorese court of law in Dili.

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This agreement is drawn up in duplicate at the place and date indicated below and signed by the contract parties.

Both parties agree to the conditions of contract mentioned above by signing below.

Signed on behalf of Employer	Employee
<hr/> Position: Name: Date:	<hr/> Name: Date:

COMPANY LETTER HEAD

EMPLOYMENT CONTRACT - SITE SUPERVISOR	
Employer	Employee
Company Name:[insert company name]	[Insert name of the employee]
Office address:[insert address]	Home address:[insert address]
Phone No:[insert phone no]	Contact No:[insert phone no or email address]

Description of the assignment

[insert name of employee] is employed as the Contractor's Site Supervisor for the road rehabilitation works on road [insert road name], in [insert district, sub district]. The work is the supervision of work activities as specified below in obligations of the Supervisor.

Conditions of Work

The employment will initially be for [insert no of months], from [insert start and end date] and is thereafter expected to be extended for the duration of the Project.

Work hours are 8-17 Monday to Friday and 8-12 on Saturday, except public holidays. The employee shall be present on the work site every day.

The employee will receive a salary of [insert amount] on the [insert date] of each month, subject to submission of verified attendance report.

The Site Supervisor shall stay permanently on the work site. Accommodation will be provided by the Company at the Project Site Camp.

The employee will be provided a motorbike for supervision (to be used for work only)

In addition to the salary, the monthly payment includes a pre-paid telephone card for communication [insert monthly amount]. Fuel for the motorbike will be provided by the company based on motorbike logbook, for approved usage only and to a maximum amount of [insert amount per month].

[Health and Accident insurance - insert if applicable]

[Incentive - insert information if applicable]

Obligations of the Site Supervisor [add/delete as appropriate]

- D. The Site Supervisor will assist the Project Engineer to plan, organize supervise, and coordinate all road construction activities and supervise implementation of all work activities. He/she will report directly to the Project Engineer.
- E. The Site Supervisor will be based in the field along the mentioned road and stay in the site camp provided by the company. He/she will spend full time in the field to supervise the work. A motorbike will be provided by the company to allow the Site Supervisor to move along the identified project sites.
- F. The Site Supervisor will perform the work described in detail below:

- 1) Coordinate with local authority like Xefe Xuku and Xefe Aildiae to recruit labour for the road construction work;
- 2) Together with the Project Engineer, establish task rates and organize the workers, tools include safety gears and organize equipment such as roller, trucks and excavator if needed;
- 3) Prepare daily site plan/report for the road construction work. And prepare daily labour muster roll;
- 4) In the absence of the Project Engineer organize labour tasks and sub-contracting work such as stone masonry drain, gabion work and culvert construction;
- 5) Control the quantity and quality of the task work. Observe the task rate and adjust the task as necessary based on site condition;
- 6) Assist the Project Engineer to monitor that all inputs are used in a cost effective manner, including materials, tools and equipment, including equipment hire agreements and other sub-contracts, etc;
- 7) Give instructions to the group leader and approve the task work that has been completed by labour before they leave the site. Motivate and encourage the workers;
- 8) Train workers where applicable especially when the workers are newly recruited. Provide on-the-job-training to the group leader and labour;
- 9) Assist the setting out team to set rod alignment and set out elevation of drainage structures;
- 10) Setting out of drainage structures work for the masonry group. Regularly control quality of the drainage structure work;
- 11) Report to the site engineer on any arising problem that cannot be resolved by his/her level;
- 12) Coordinate with Xefe Suku and Xefe Aildeai to make payment for labour;
- 13) Undertake any other activities relevant to the assignment, as instructed by the Project Engineer and Director.

Obligations of the employer

The Employer shall provide overall guidance and direction for the work;

The Employer shall provide the necessary input for the timely implementation of project activities, including sufficient supervisory capacity, materials, equipment and labour;

The Employer shall provide Motorbike and Fuel for the supervision;

The Employer shall pay on time and in full.

Legal Issues

[The Employer shall provide the Employee with a staff health and accident insurance.] The Employer will not be held responsible for any expenses relating to accident, illness, injury or death, whether this to be incurred in the services covered by this Contract or not.

Any conflicts that may appear during the execution of this contract will be resolved by mutual agreement between the two parties. In case failing to reach an amicable solution, the issue will be submitted to the proper Timorese court of law in Dili.

This agreement is drawn up in duplicate at the place and date indicated below and signed by the contract parties.

Managing Your Road Construction Business

Both parties agree to the conditions of contract mentioned above by signing below.

Signed on behalf of Employer	Employee
Position: _____ Name: _____ Date: _____	Name: _____ Date: _____

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Training modules developed through the Enhancing Rural Access Project, with technical support from the ILO and funding from the European Union and the Government of New Zealand