



Partners for Water and Sanitation

Note on project reports

The following report has been prepared by Partners for Water and Sanitation in response to a project Terms of Reference.

The content of the report is based on the opinion of the author(s) and does not necessarily represent the opinions of the wider PfWS partnership, or the project funders.

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Report on Visit to W.W.C.E. Ethiopia

7th to 11th August 2006

Project terms of reference

1. The prime objective is for an initial exchange with a UK construction company in order to establish a way of sharing best practice.
2. Support is also required in establishing a strategy for building technical and managerial capacity in the organization.
3. Initial visit to establish a twinning process and assessment of needs.

Programme carried out

- Mon 6th August : am meeting with Martha Solomon, MoWR – to set the principles to be followed
pm meeting with W.W.C.E. Bakele Gadissa and Ato Yiliker – a general overview the role of WWCE and the works they carry out
- Tue 7th August : am accompanied visit to WWCE Operations Depot
pm accompanied visit to Gafarsa (Addis Ababa Water Supply Project)
Contract 2/3
- Wed 8th August : am / pm accompanied visit to Kasem Kabena Dam
- Thu 9th August : am meeting with WWCE HO Contract Administration Dept
- Fri 10th August : review meeting with WWCE Ato Kiros and Ato Yilikel
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Visit to WWCE Workshops

Meeting with Ato Yiliker and three senior staff members with a walk around inspection of the facilities.

Observations

The vehicle repair workshops are spacious with good pits but needs overhead runway beam. The sites are set up with workshops/garages as necessary, with some personnel seconded from the base and the rest recruited locally, and they are tasked with repairing plant and transport at site level. If level of repair is high then defective item is brought back to base for repair – though typical situation is to wait for the spare part for a few/several months – hence downtime off site is very long.

Current strategy is to work more closely with the local Agents to determine if strategic spares can be held by the Agent for call off as required – looking for a 4 months rolling holding of spares – this will reduce spares holdings.

Electrical repair workshop has little equipment, new test rig not fully functioning

Two large stores buildings with 7000 and 13000 items stored within – stores for construction equipment and vehicles – high level of stores for some 500 items of plant and transport on WWCE Asset List i.e. an average of 40 items of spares per item. High level of working capital held in this stores system. I understand the stores inventory has been put on the market to receive tenders to buy part or all of the non-essential stores holdings.

Steelwork fabrication workshop very basic with one set of mechanical shears, and all components hand welded – no painting or protection workshop on site.

Communications between offices is affected by the large distances between differing offices and the main communication method is the hand transfer of paperwork

The paperwork requisitions came in from the site, then a request is written out to stores to check what is available from stock, and then any remainder is written out and sent to procurement for buying. The goods come in to stores and copies sent to Procurement and Inventory. Then a consolidated delivery is sent to site by Procurement and Supply Administration Division. This series of operations is very strongly paper based and includes a lot of duplicative effort with the extra cost and time involved.

Buying of new plant and transport is through a Government directed Tender process, and the selection of plant may have foreign currency and political considerations. The result of which is a very diverse range of manufacturer of the plant and transport – with consequent high spares holdings and costs. Current strategy is to seek to procure a two years warranty/spares support as part of the procurement process – will again reduce stores.

Organisation charts are available for the process – but could improved as part of the proposed business re-engineering programme to highlight communication routes and decision points.

There appears to be a large number of support personnel involved in carrying out clerk duties – predominately data entry and input, transferring to data to another process, then cross-referring – there is a dept to analyse the data – the data produced is very detailed down to each Birr spent on each piece of equipment, how much plant, labour and materials used – however I remain unsure what the

data is used for and how decisions are made based on this data. Does the data form the basis of the charge out for the plant to each site, does it determine the economic replacement timings for plant ?

RECOMMENDATIONS

1. stores to be slimmed down to reduce tying up working capital – process already ongoing
2. planned maintenance of plant and transport to be improved – the data on costs already collated to form basis of predictive costs to maintain each plant operational – this would require investment in a software package, with a WBS (work breakdown structure) to relieve the considerable manual data collection and entry.

Visit to Gefarsa Contract

Observations

This contract was won in a competitive tender environment and the scope and content of the document has areas of grey which is becoming the source of some friction on the site. The principle issue is one of design responsibility. The Sup Eng believes he has a design and build contract with WWCE, whereas WWCE believe they have a conventional build contract with the Sup Eng (or Designer) providing the designs for WWCE to build. As always in these situations there is a bit of both here – Article 12 of the Special Conditions to the FIDIC Contract state the design responsibilities of the Contractor explicitly :

“Construction drawingsthat are necessary for the successful completion of the Contract. In particular

construction phases – **which I take to mean the sequence of the works i.e. the planned programme**

construction details - **which I take to be the details of the bespoke materials i.e. waterbar**

drawings and calculations for temporary works – **these are self explanatory and normal for a contractor to provide**

steel reinforcement drawings and bending schedules – **ordinarily I would expect these to be provided by the Designer – however it is becoming more common in the UK to have this duty as the Contractor BUT the Designer must do the design and calculate the size and location for the rebar then the Contractor can have the rc details and bending schedules prepared**

maintaining stability of excavations” – **this is a normal Contractors duty for civils works**

This is my interpretation only and is based on a view of a “ normal” build contract , however the second paragraph refers to “all these documents concern all permanent and temporary works” which is what the Supervisor is relying upon in his argument. To the best of my knowledge there is no Bill of Quantity item for carrying out the design as seen by the Supervisor and hence no method of reimbursement for the design. I would suggest the design in its entirety was not foreseen to be the Contractors alone, but a balance between the Designer to design the structures and pipelines from first principles and for the Contractor to deliver the construction details only may be a way forward.

This is a fundamental issue with this project and requires to be discussed and agreed as soon as possible between the principles to the Contract, as failure to resolve this will severely impact upon the delivery of this scheme with consequent loss of reputation to WWCE.

The site Project Manager, Ato Mulugeta, was knowledgeable in the use of the F.I.D.I.C. standard contract and was very disappointed that he French Sup Eng was not following the FIDIC route in issuing instructions, approving drawings and checking work and quality. This symptomatic of a poor relationship where the fundamental issues of the Contract are not being fully understood by the respective parties.

Site compound access very poor – even though it was the rainy season – the use of some local stone to keep an acceptable access to the compound would be strongly recommended. The actual compound and stores and workshops areas were all acceptable and well set out.

The site organisation chart was acceptable with the work areas split out under different engineers to lead, with the support functions feeding into the Project Manager.

During conversation with Supervisor (French) he complained bitterly about several items and I record them purely for information

1. the quality of the road access to the site compound was terrible and in my view he is right – he arrives at site in a bad temper because of the access problems. This needs a bit of care and attention to his needs.
 2. in his view the site is under-resourced with 2 Engineers – in his view it needs 20 Engineers : note new mature Engineer started that day to assist the project
 3. annoyed at quality of Supervisors accommodation – not to European standards – perhaps met him halfway with some upgrading of accommodation – a worthwhile investment
 4. accused WWCE of having no robust plant – always broken down
 5. he believes the wet season is not a reason to stop all works – he sees no reason not to continue some productive work – pointed out that such works are normally done in the winter in Europe
 6. does not accept mixing concrete in mixer trucks – his view mix must be fully batched and tested before going into mixer – my view is test mix when it is being poured then risk is with Contractor as to the mix meeting Specification
 7. very frustrated by lack of design being done – see above
 8. sees no end to the work – no programme being worked to at all and a constant lack of labour and tradesmen – sees being on site for another two/three years
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Visit to site works – comprising remedial works to spillway and cascade, raising the dam face by 1.8m and providing distribution pipelines down the valley

Spillway works essentially complete

Dam raising – will not happen to programme as no visible design done to date – no proper method statements prepared (however consideration is being given to a conveyor to lift the concrete to the required profiles along the dam face).

WWCE PM views that Supervisor is being negligent as he only inspects work after it is done, i.e. he is allowing work to proceed regardless of design and makes criticism afterwards – again this is a communication and trust issue.

WWCE wants Supervisor to give clear written instructions as per FIDIC, but Supervisor will not do – I think there is a fear of variations and increased costs behind this and again after by the design issue – i.e. he has no design to approve so cannot comment or approve any work taking place. The risk here is when it comes to Taking Over of the Works when no design has been approved or construction audited – hence Take Over is delayed indefinitely. Not a good commercial position to be in.

The WWCE Engineers want final drawings before they start to take off quantities for ordering and planning but they expect things to change so they hold off doing anything until it is at the last minute. I understand they are taking off from design concept drawings provided by the Designer through the Supervisor – so some design is being done somewhere!

Engineers expressed concern re the quality of the surveyors using the new total station instruments – issue is one of training – perhaps an in house course needs to be organized.

Regarding planning of the works – this is done using MS Project , at an elementary level with only a limited number of activities (generally as described against works items in the BoQ) and with no cross relation to resource requirements, production nor procurement.

Whatever design is being done at site level is being done on Autocad, but again competence of operators is not high – again a training course required fro internal resources or seek better qualified staff externally.

Summary is that the relationship between WWCE site staff and Supervisor is very poor, with Supervisor issuing directions/instructions verbally but not in writing, whilst WWCE PM wants everything in writing before he will proceed, particularly as things change frequently on the pipelines. The issue is proper contractual management allied with design change control.

Visit to Kasem Kabena Dam

Visit to site some 250km from Addis, with Ato Kuros

Project Manager is Ato Worko.

The site organisation is visible and defines Engineering and Surveying responsibilities for each area of work i.e. Main Dam, Saddle Dam, Diversion Tunnel, Irrigation works and Access roads.

The Supervisor has a staff of 35 in total inc drivers, and a team of 10-11 Engineers who shadow the WWCE Engineers.

WWCE site staff of c280, with c1300 day labour, 19 Engineers, 12 surveyors.

Process : Engineering Section receives drawings from Designers and checks the drawings, these are then issued to the Construction Engineers, who take off the quantities and then order the requisite materials. The PM + Engineering+ Construction decide the number and type of plant required to do each section of work.

Programme of works is instigated at Head Office, but after award, and then sent to site for revision , then to the Consultants for their input, and following several rounds of this the programme is approved by the Consultant and then distributed.

A sample of a Monthly report was reviewed – this was very detailed and quantified the costs expended but does not equate this to the value achieved and the relationship between progress v programme is not visible. Programme is based on the previous lack of progress – i.e. no recovery programme is generated. Note in a 24 month contract period , the project is currently in month 18, with progress at c month 12 i.e. 6 months behind schedule.

Design – Site team very concerned re the late delivery of the design information, with even 'final' drawings not complete for construction, and the team is chasing changes by letter from the Designers (very contractual approach), and the site team do not feel involved in the design development or have the opportunity to influence the design. WWCE are just following the design and do not have the ability to plan in advance.

Improvements discussed with site team

- planning and programming is not a lifecycle process or document and investment is needed in new software and training
- the site distances are vast and time to communicate between work areas is costly – suggest investment in two way radios
- a Project team ethos needs to be developed with the Designers and Supervisors where the issues re design and construction progress are jointly shared – this needs investment in facilitated workshop to develop relationships and raise confidence of construction team to be more involved in shaping the design an scope of works
- the Business Process Re-engineering exercise should focus on the interfacing of design and construction disciplines

- a key area for improvement is change recognition and change control, all leading into more focused management of the commercial progress of the project.
- Productivity is not tracked against any target - what is measured is actual, and is not compared against a target - no revisions to plant and labour resources is derived to recover programme
- It was noted that materials consigned to site by HO are received at site stores and kept there until required by the site teams. The costs of the materials are not charged to the project upon receipt at site but only upon when used at site. The efficient usage of materials is not then tracked properly i.e. wastage etc, and the costs as reported by site are not accurate as to value of goods in stores.

Visit to HO Contract Administration

Meeting with Ato Zed Get chew

A small HO department deals with :

- 1 construction cost estimates – with 3 estimators
- 2 payment certificates to clients
- 3 compile project reports
- 4 prepare claims
- 5 as built drawings

1 Cost estimates

Prepared at start of project and at tender stage – Excel is used for deriving a rate for plant, labour and materials for each work item, all materials sourced locally to the site – the rate is not made known to the sites and hence no comparison at site re actual production as compared to target production is made.

Upon award, the gross outputs are used to arrive at the numbers of plant/equipment based on tender programme (produced by estimators) and is based on a spend profile not the construction sequences.

3. Payment certificates to client

The value of the works completed and costs at site level are prepared in great detail at each site – and based on what has been signed off by the Supervisor, and then collated and prepared for submittal to Consultant, who approves and sends to Client for payment – overall a 2 to 3 month process.

4. Claims/Variations

These are identified at site level and raised with RE/Supervisor – who generally sends to HO for a decision. If approved the RE/Supervisor issues a written Variation Order.

If he RE/Supervisor makes a decision on principle and quantum , then the rates used are the rates in the Contract with o negotiation. However the issue of associate time and delay and additional preliminaries are not included – in essence the quantum changes only are recognized and paid and WWCE seems to take the risk on program and time related costs.

On the evidence I heard, time is only ever claimed as mitigation to the application of Liquidated Damages.

This overall approach is not robust – the considerable costs of running a site establishment and staff and labour do not seem to be valued in the final accounts.

Note : contracts have generally been remeasuarable on quantum – the risk is that commercially bid contract are Lump Sum which increases the risk to WWCE with their present systems.

5. As Built Drawings

This is done by 2 people at HO, on Autocad, based on red lines drawings from site – note that the remote sites also have draftsmen doing As Built Drawings – where the divide in responsibility lies was un clear.

Summary Findings

1. Construction is generally as expected i.e. labour intensive of generally acceptable quality
2. The delivery model of WWCE is a vertically integrated company i.e. own plant, staff, labour, transport, fabrication i.e. a labour orientated contractor and not a management contractor – this is a typical approach in an emerging market economy, with little entrepreneurship for small to medium enterprises who would provide a diverse sub-contracting capability to large construction enterprises.
3. The staff were well qualified and knowledgeable in their disciplines, with an enthusiasm to improve what they do.
4. The systems and processes are paper based, with a large number of interfaces and duplications of data entry, with commensurate large numbers of clerical staff. Each individual process may well deliver its own unique output but is not 'joined up' I understand there is a programme for carrying out Business Process Re-Engineering Workshops , which should identify and address these issues and produce an Improvement Plan.
5. Planning is poor with no real ownership of the overall programme. The programmes are visible to all, nor are they used as a management tool to plan works, but only to record actual progress. The programmes are not integrated with procurement nor design deliverables. Changes to programmes are not recorded or analysed to see impact on time and costs, nor for the recovery of time and prelim related elements of variations.
6. Relationships and communications between designers and WWCE are not good on any site , and stem from lack of joint purpose and relate to a master/slave type of relationship. There is no evidence of working together to resolve problems.
7. Availability of plant (operational) is an issue with works on old awaiting repair or replacement of a critical piece of plant. The quality of both HO an Site servicing support needs to be improved. In the market n Ethiopia the availability of new or reliable plant will remain an issue of available finance.

Assessment of Needs

1. Planning to be introduced across all divisions as an 'end to end' process- from tender through contract to completion. The planning to include the design deliverables and procurement functions, with lead in times, and resource input for plant, transport, staff and labour.

This requires a selection of the best appropriate software, investment in hardware to run it and investment in the people to use it. A training programme for Contract Managers, Project Managers, Site Agents and Engineers (>100 people) would involve an external training company to do this.

2. Design management and change management require to be improved, again by structured training on contract management principles and commercial management skills .
3. The relationships with Designers and Supervisors requires improvement – through personnel development training on relationship and team building.
4. BPRE to be applied to all areas of the business, and improvement programmes implemented.
5. Develop a system of Key Performance Indicators (Kepi's) to determine if the improvements and investments are providing the right returns.

Planned Support from PAWS

1	Provide a review of planning software available and suited to WWCE needs
2	Investment in Contract Management training – to cover commercial controls, contracts terms and conditions and change control processes
3	Provide a review of plant and transport maintenance and servicing scheduling software
4	Secondments from WWCE to UK for experience and best practice transfer.
5	Develop a set of KPI's to measure business improvements
6	Provide a hotline/telecom/e-mail named support system for unique advise on specific problems
7	Provide sample processes of contract management procedures to WWCE for review in their BPRE workshops