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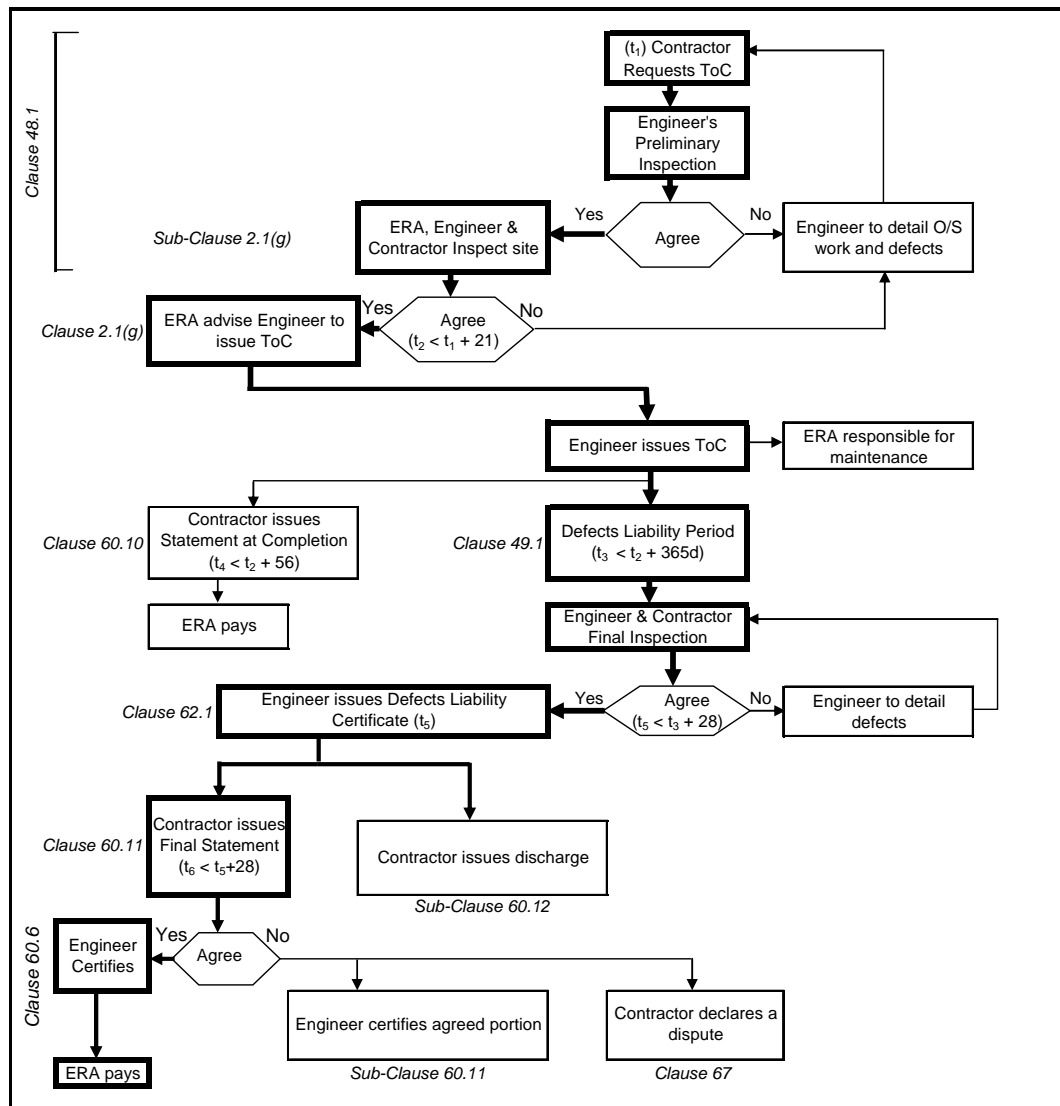
8 PROJECT CONCLUSION

All projects have specified periods for completion and, as the project period draws to an end there are a number of items to be considered and tasks which need to be undertaken to properly conclude the project. These considerations and tasks include, but are not limited to the following:

- Completion of the Works
- Taking Over Certificate
- Performance Security
- Statement at Completion
- As-Built Information
- Defects Liability Period
- Final Statement
- Project Records
- Divisional Handover

The flow chart below details all of the project conclusion tasks and timing (including their applicable FIDIC IV clauses)

Project Conclusion Tasks and Timing



8.1 COMPLETION OF THE WORKS

Although the FIDIC (see Appendix 3-5) conditions of contract are not applicable to every contract they are typical of most conditions of contract and are therefore used to assist in the explanations of the requirements of this stage of a project.

FIDIC defines the Works as follows:

“The permanent and temporary works to be executed in accordance with the Conditions of Contract (Parts I & II), the Specification, the Drawings, the Bill of Quantities, the Tender, the Letter of Acceptance, the Contract Agreement and such further documents as may be expressly incorporated in the Letter of Acceptance or Contract Agreement.”

it further defines the time for the completion of the Works as follows:

“The time for completing the execution of and passing of Tests on Completion of the Works shall be as stated in the Contract (or as extended under Clause 44) calculated from the date on which the Contractor receives the notice to commence from the Engineer.”

In the event that the works are not completed within the Time for Completion FIDIC defines the following course of action:

“If the Contractor fails to comply with the Time for Completion for the Works, then the Contractor shall pay to the Employer the relevant sum stated in the Appendix to Tender as Liquidated Damages for such default for every day or part of a day which shall elapse between the relevant Time for Completion and the date on which the Works are completed”

The concept of Liquidated Damages has already been discussed under section 6.5 above and will not be repeated here.

It is clear, therefore, that the Contractor is required to continue with the works until they are completed no matter what the time taken is and that in the event of the Contractor not completing the works on time they would be required to compensate the Client for losses incurred.

Notwithstanding the above, when the Contractor considers the project to have been completed in accordance with the drawings, specifications and conditions of contract they are at liberty to request the issue of a Taking-Over Certificate from the Supervising Engineer (see 2.3.8, 5.2.17, 6.6.3 and 8.2). At this stage the Supervising Engineer may either issue such a certificate, if he considers the Works to be complete, or advise the Contractor that he does not consider the works to be complete and furnish the Contractor with details of those works, which he does not consider to be complete. In any event once the works are considered to have been completed such that the project may be used for the purpose for which it was intended, the Supervising Engineer will issue a Taking-Over Certificate.

8.2 TAKING-OVER

FIDIC makes provision for this in Clause 48.1 Taking-Over Certificate as follows:

When the whole of the Works have been substantially completed and have satisfactorily passed any Tests on Completion prescribed by the Contract, the Contractor may give notice to that effect to the Engineer, with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work during the Defects Liability Period. Such notice and undertaking shall be deemed to be a request by the Contractor for the Engineer to issue a Taking-Over certificate in respect of the Works. The Engineer shall, within 21 days of the date of delivery of such notice, either issue to the Contractor, with a copy to the Employer, a Taking-Over Certificate, stating the date on which, in his opinion, the Works were substantially completed in accordance with the Contract, or give instructions in writing to the Contractor specifying all the work which, in the Engineer's opinion, is required to be done by the Contractor before the issue of such Certificate. The Engineer shall also notify the Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive such Taking-Over Certificate within 21 days of completion, to the satisfaction of the Engineer, of the Works so specified and remedying any defects so notified.

The issue of this certificate is significant for two reasons. The first is that it defines the date from which the Contractor ceases to be responsible for the maintenance and care of the works, excluding the rectification of any defects which occur during some specified period (the Defects Liability Period, see 8.6). There are some insurance related exceptions to this statement but these will not be discussed here. The second is that it defines the date from which ERA becomes responsible for the care and maintenance of the works. It is important in this regard to differentiate between the Contractor's liability for defects in the works constructed and ERA's liability for the maintenance of the works. This difference can best be explained by the following example:

If a defect occurs because of the failure of the base course due to lack of compaction the Contractor would be held responsible for the problem and would be required to rectify the problem at its own cost. However, if the same defect occurred because of the failure of the base due to some mechanical damage the Contractor would not be held responsible and would not be required to rectify the problem without compensation.

As stated above the Contractor only remains liable for the rectification of defects for a short period, usually one year, whereas ERA becomes and remains liable for the maintenance of the works from the date of issue of the Taking-Over Certificate. It is, therefore, of vital importance that the project is properly handed over to the various ERA organisations associated with maintenance and that this department (DMO) is fully familiar with the details and maintenance requirements of the project.

In February 2000, under the DFID Contract Capacity Building Project, a Draft Guideline for the Acceptance of Works was issued for the use of ERA. This document and its report formats are still valid and have therefore been included as Appendix 8-1 - Guideline CA12 Acceptance of Work to this document. The formatting of this document has been changed from the original in order to reduce the number of pages. The content, however, remains unchanged.

In addition to addressing the needs at the completion of a project, the guidelines also address the general acceptance of works throughout a project.

Although the ERA Acceptance Guideline addresses the issue of a Taking-Over inspection it does not address the physical and logistical aspects of such a meeting. These aspects are discussed further under this heading.

As previously stated, the result of this inspection is that the responsibility for the maintenance of the works is transferred from the Contractor to ERA by the Supervising Engineer. It is therefore essential that the representatives of the following organisations attend this visit:

- The Supervising Engineer
- The Contractor
- ERA CCID Department
- ERA Maintenance Department
- District DMO

The function of this visit is for all those in attendance to satisfy themselves that the Contractor has constructed the works in accordance with the drawings and specifications and that they are prepared to take over the works from the Contractor. This assumes that all parties have been involved in the project from its inception and are familiar with the drawings and specifications and that they are satisfied with the intended end result. This is important, because it is too late at the time of this inspection to object to any aspects of the design (as opposed to the constructed works) which are not acceptable.

It is necessary, during this visit, to confirm the information reflected on the various schedules and As-Built drawings (see 8.5) referred to above. Any unfinished works or defects identified during this visit must be completed / rectified by the Contractor during the Defects Liability Period (see 8.6).

Appendix 8-1 - Guideline CA12 Acceptance of Works includes a format for a Taking-Over Inspection Memo and Outstanding Works Form.

8.2.1 Taking-Over Procedures

The following Taking Over procedure is suggested:

1. At least two weeks before the intended issue of a Taking-Over Certificate the supervising consultant is required to provide ERA (CCIB) with the following documents for their review and approval:
 - Complete Set of As-Built Drawings
 - Project Completion Report (the report can not be final at this stage but the bulk of the content and format can be).
2. When the Consultant receives these drawings a date must be set by for a formal inspection of the site prior to the issue of the Taking-Over Certificate. The CCIB (PE) must attend this inspection.
3. CCIB (PE) is required to circulate a copy of these drawings and the report to the DMO and the Head of DMO who will be responsible for the maintenance of the project. CCIB (PE) must advise both Maintenance and the Head of DMO when the Taking-Over Inspection will be and request their presence at the inspection.
4. Maintenance and the Head of DMO must review the drawings and report and pass any comments to CCIB.
5. CCIB (PE) must incorporate the comments of Maintenance and the Head of DMO and forward these to the Supervising Engineer prior to the intended Taking-Over inspection.

6. The following must attend the Taking-Over Inspection:
- The Supervising Engineer
 - The Contractor
 - CCIB (PE)
 - DMO (Representative)
 - Head of DMO (Representative)

It is the responsibility of CCIB (PE) to ensure that all of the ERA representatives (Maintenance and Head of DMO) attend.

During the Taking-Over Inspection it is the responsibility of the Supervising Engineer to highlight all of the maintenance requirements peculiar to the project.

It is important that the Project Engineer make it clear to Maintenance and the Head of DMO that the Contractor is not responsible for any Maintenance during the Defects Liability Period and that they (Maintenance and Head of DMO) are responsible for the Maintenance from the date of the issue of the Taking-Over Certificate.

Following the Taking-Over Inspection it is the responsibility of CCIB (PE) to ensure that all unacceptable items identified by CCIB, Maintenance and the Head of DMO are included on the list of items to be completed and/or rectified during the Defects Liability Period.

7. Once the all of the unacceptable items have been rectified and ERA is satisfied that the Taking-Over Certificate may be issued they should advise the Engineer of such in writing and the Engineer will then issue the Taking-Over Certificate. A sample letter from ERA to the Engineer has been included in Appendix 8-4 - Sample Taking Over Letter and a sample Taking-Over Certificate is included in The ERA Guideline in Appendix 8-1 - Guideline CA12 Acceptance of Work

8.3 PERFORMANCE SECURITY

The concept of a Performance Security is discussed under section 5.2.3 and 6.1.4.2 and will not be discussed here other than to say that the original Performance Security document must be returned to the Contractor within a defined period of the issue of the Defects Liability Certificate.

In the event that the original Performance Security document has been mislaid a letter to the institution which issued the Security advising them that the Contractor has fulfilled all of their obligations with regard to the contract and that the Security is no longer required by ERA should suffice.

8.4 STATEMENT AT COMPLETION

The Statement at Completion was discussed in section 6.6.3 with regard to the conclusion of the project it is important that the receipt of this statement be seen as the first step in the real definition

of the final contract amount which will permit the planning of the projects cash flow requirements to the conclusion of the project.

8.5 AS-BUILT INFORMATION

The ERA Taking-Over Guidelines do not address the issue of the production and handing over of As-Built Details. The following sections address this aspect of project conclusion and handing over.

Although the organisations responsible for maintenance of the road should have been following the progress and development of the project this usually does not happen. In order for Network Management Division/DMO to ensure that they are fully familiar with the details and maintenance requirements of the project it is necessary for ERA to have comprehensive details of the completed works.

The need to hand over information to the Network Management Division once a project has been taken over was introduced in Section 5.1.2.4. The actual information to be handed over is now discussed here in more detail.

The purpose of producing As-Built information and having a formal Taking-Over inspection and procedure is to ensure that ERA's planning and maintenance organisations are fully familiar with the project and its maintenance requirements. To do this it is necessary for ERA to have comprehensive details of the completed works. These details should include, but not necessarily be limited to the following:

- The road foundation structure and materials, including material properties
- The type of surfacing, including material types, grading, application rates, mix proportions etc.
- A road inventory including signs, markings, markers, bridges, culverts etc.
- A road condition survey
- A set of As-Built drawings
- Any other details with maintenance requirements, peculiar to the project.

All identified and located on the basis of the national road network i.e. by link number.

8.5.1 Foundation Structure

This information should detail the number of foundation layers, the method and degree of compaction applied to each layer, the type of material used for each layer including typical material grading, PI's, structural strength parameters etc. and finally the source of the material and accessible remaining quantities. The information on the foundation layers and degrees of compaction should be included on the As-Built drawings for each distinct section of road whilst the details of the material sources and type should be included in the Final Project Report.

8.5.2 Road Surfacing

This information should detail the nature of the surfacing, the thickness of the surfacing layers, the bitumen application rates, the grades of bitumen used, asphalt mix designs, the nature of surfacing materials, the physical properties of the materials used and their source and accessible remaining quantities. The information on the grades and application rates should be included on the As-Built

drawings for each distinct section of road whilst the details of the material nature and physical properties should be included in the Final Project Report.

8.5.3 Road Inventory

This information should detail the type, size, material etc. of all road signs (both vertical and horizontal), type, placement etc. of distance markers, position and reference for bridges and culverts, junction references, guard rails etc. This information should be included on the As-Built drawings for each distinct section of road and can be summarised in accordance with the guidelines in Appendix 8-2 - Guideline CA13 Road Inventory Survey.

8.5.4 Condition Survey

This information is particularly important because there is often the misconception, if work has been undertaken on a road, that no further work will be required for a number of years and that the road will remain in perfect condition. This is obviously not the case, particularly where full rehabilitation is not being undertaken. In these cases the surface roughness is likely to be fairly high, the design life fairly short and the maintenance and future planning requirements greater than a newly constructed or reconstructed road.

This information should detail the condition of the road surface, the shoulders, road edge, drains, vegetation etc. at the time when ERA takes over the Maintenance Liability. Ideally this information should include a bump integrator or similar roughness measurement. This information should be provided in a form similar to that indicated in Appendix 8-3 - Guideline CA14 Road Condition Survey to these procedures for each distinct section of road as well as being included on the As-Built drawings.

8.5.5 As-Built Drawings

These drawings will contain most of the information included in the first three sections above. Recent changes to ERA's standardised contract documentation require that these drawings be available at the Take-Over stage. These drawings reflect the details of the works actually constructed as opposed to those originally designed. In general, there should not be substantial differences between the As-Built and Design details although there have been examples of substantial differences on a number of recent ERA projects. These drawings should provide sufficient details to facilitate the reconstruction of the project or any component thereof.

The As-Built drawings shall comprise, but not necessarily be limited to the following:

- All drawings, sketches, schedules, notes etc. used to describe the works undertaken, duly amended to reflect the actual positions, dimensions, numbers, materials etc. utilised and constructed.
- All Contractor's drawings (if applicable) in accordance with the Construction contract.

8.6 PROJECT COMPLETION REPORT

In general Consultants' terms of reference require them to prepare a completion report and reference drawings at the end of the contract. This is generally taken to be the end of the Defects Liability period. However this results in ERA and its Maintenance organisations having to assume responsibility for the project without the benefit of technical information necessary for the maintenance of the project.

It is therefore recommended that the Consultants be required to provide a Project Completion Report at least two weeks before the intended Taking-Over inspection and that the report includes the As-Built drawings, Road Inventory and Road Condition surveys. In the case of partial completion and acceptance the report would only be required to reflect that section of the project been taken over.

The Project Completion Report should comprise but not necessarily be limited to the following:

- The rationale for undertaking the project
- A description of the project and its location
- Details of the parties involved in the project
- Details of the Funding Agencies
- Comments on the general implementation of the works
- Comments on problems encountered in the implementation of the works
- Details of solutions to problems encountered
- Comments on the project design
- Details of all design changes with the rationale therefore
- Maintenance requirements and additional work required
- A financial statement including full supporting calculations and measurements

At the time of taking over, the only information which will not be available for the report at this stage will be the final financial details of the project and the information related to the Consultancy contract which can be included in an addendum or revision of the report at the end of the Defects Liability Period.

Therefore, on completion of the Defects Liability Period the Consultant should be required to submit a final consolidated version of the Project Completion report containing all of the above information in its finalised form plus the following:

- All finalised Project Completion Report details
- Details of the Consultant's Staff inputs
- Details of the Consultant's supervision contract
- Problems encountered by the Consultant in supervising the contract
- Comments on the contract
- Financial details of the Consultant's contract.

8.7 DEFECTS LIABILITY PERIOD

Although the Defects Liability Period expires automatically, in terms of the contract (see Appendix 3-5 FIDIC IV Clause 62.1), the Defects Liability Certificate is not usually issued until all outstanding works have been completed. An inspection must be undertaken in order to verify that all items have been attended to and in order to identify if any other items require attention.

On the expiry of the Defects Liability Period and not the issue of the Defects Liability Certificate, ERA is required to release the final retention held by them.

Prior to and in anticipation of the expiry of the Defects Liability period an inspection of the works must be convened to determine if there are any remaining defects or outstanding works.

This Defects Liability Inspection must be attended by the following:

- The Supervising Engineer
- The Contractor

- The Project Engineer
- DMO

It is the responsibility of the PE to ensure that all of the ERA representatives attend.

Following the Defects Liability Inspection it is the responsibility of the PE to ensure that all unacceptable items identified by DMO are included on the list of items to be completed and/or rectified by the Contractor.

On satisfactory completion of the works, remedying of defects and completion of outstanding items a Defects Liability Certificate is issued by the Engineer to the Employer, with a copy to the Contractor. The issue of this Certificate prompts two actions (i) It releases the Contractor from all of their obligations associated with the contract and (ii) It signals the end of the contract.

The procedures to be followed for the Defects Liability Inspection are summarised in Appendix 8-1 - Guideline CA12 Acceptance of Work. The formatting of this document has been changed from the original in order to reduce the number of pages. The content, however, remains unchanged.

8.8 CONTRACTOR'S PERFORMANCE EVALUATION

The evaluation of a Consultant's performance in the delivery of services was addressed under section 7.10 and Appendix 7-18 Guideline CA10 Consultants Performance Evaluation. The content of those sections is equally applicable to Contractors. In fact the GoE Procurement Proclamation 430/2005 (see page 7-200) does not differentiate between Consultant's providing services and Contractors undertaking works, and both are jointly known as "Suppliers".

Notwithstanding, the evaluation of a Contractor's performance is somewhat easier than that of Consultant's as one has the physical works with which to gauge the performance. This will, however, only be possible at the end of the project. In the event of any accusation of poor performance during the course of a contract it is essential that the matter be formally committed in writing and communicated to the Contractor who must also be given the opportunity to respond. This communication and the subsequent actions taken, if any, must all be recorded and included in the final Contractor's Performance Evaluation.

One must, however, be careful not to confuse the Contractor's use of the contractual provisions as an indication of poor performance by the Contractor. In fact quite the contrary might be true i.e. Claims might indicate poor performance by the Engineer or the Client. At the time of preparation of this manual this was exactly the case with ERA's failure to provide timely access to their sites because of RoW issues.

To assist evaluation of future tenders, an assessment should be made of the Contractor's performance on the Contract, either during or at the end of the Contract period. A format for this evaluation is included in Appendix 8-6 - Contractor's Performance Report.

The Engineer should, in the first instance, compile a report on the Contractor's performance on the project. Prior to submission of the report to the ERA, the assessment must be discussed with the Contractor. Any criticisms of the Contractor's performance must be explained and the Contractor given an opportunity to respond. Minutes of the meeting with the Contractor are to be taken and attached to the report.

8.9 FINAL STATEMENT

The Final Statement is the name given to the document which details the final total amount of money to which the Contractor considers itself to be entitled.

Normally this Final Statement will take the form of a Bill of Quantities which reflects the final quantities of each item of work. This Bill of Quantities would also be supported by measurement sheets which would detail the exact calculations of each and every aspect of each item in the Bill of Quantities. These measurements must be based on the Standard Method of Measurement applicable to the particular contract. In the case of road works or more complicated structures it will be necessary to include references to construction or As-Built drawings on the measurement sheets.

In the event that, at this stage, there still remain items in dispute or which have not been agreed these will also be reflected on the Final Statement.

The bottom line on the presentation of a Final Statement is that “Checking of the quantities to verify payments must be possible from the supporting measurement sheets by a person who is not familiar with the project”.

Having prepared the Final Statement FIDIC requires that the Contractor submit a Discharge (FIDIC Clause 60.7) confirming that the total reflected in the Final Statement represents full and final settlement of all monies due to the Contractor arising out of or in respect of the Contract. Implicit in this statement is the requirement that it only becomes applicable after the payment of all outstanding amounts and the return of the Performance Security.

8.10 PROJECT RECORDS

The project records will generally originate from two sources. The first is ERA itself and will comprise all of the correspondence, communication, design, documentation etc. since the commencement of the project with the Planning and Programming Division, through the Feasibility, Design, Procurement and Implementation stages and the second will be that generated by the Supervising Engineer during the Implementation stage.

The information generated by ERA should be in the possession of the Works contract PE and the responsibility for collating all of the information and ensuring its secure archiving will fall on him.

The information generated by the Supervising Engineer will, in all likelihood, be passed onto ERA by the Engineer for similar archiving and storage following the inputting of the As-Built information into the Network Management Division's network monitoring system.

8.11 DIVISIONAL HAND OVER

It is important that the records of the project are safely stored for future reference and that the As-Built information and maintenance requirements are made available to those organisations responsible for maintenance. For this purpose a hand-over meeting should be convened and attended by at least the following:

- Head Construction Contract Implementation Branch
- Resident Engineer
- CCIB Project Engineer
- Head of Network Management Division
- Head of Planning and Programming Division

- DMO

The agenda for the meeting should include, but not necessarily be limited to, the following:

- Project Data
- Design Implemented
- Project Funding
- Problems Experienced and Solutions Implemented
- RoW as established
- Handing Over of the following documents:
 - Project Final Report
 - As-Built Details
 - All project correspondence
 - Computer files
- Supervising Consultant
- Maintenance Requirements
- Handing Over of ERA Assets
- Any Other Business

8.12 APPENDICES

See the following pages for Section 8 Appendices.

Appendix 8-1 - Guideline CA12 Acceptance of Works

GUIDELINE N° CA12



Ethiopian Roads Authority

Guideline N° CA12 Acceptance of Works

Contract Administration Manual

February 2000
Rev November 2006

**FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
ETHIOPIAN ROADS AUTHORITY
CONTRACT ADMINISTRATION DIVISION**

ACCEPTANCE OF WORKS

February 2000

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ACCEPTANCE OF WORKS

1 INTRODUCTION

The acceptance of work by the Engineer is a process which allows him to accept, on behalf of the Employer, that the whole or parts of the Works are complete and conforming to the Contract. The penultimate acceptance is when the Engineer issues the Taking-Over Certificate, which denotes the substantial completion of the contract (or parts of the Contract), and the start of the Defects Liability Period. This is the stage where the Employer takes over the Works.

Final acceptance is when the Engineer issues a Defects Liability Certificate. This depends on the Contractor having completed all work and having remedied all defects, following an inspection made by or on behalf of the Engineer prior to the expiration of the Defects Liability Period.

Acceptance of work, however, takes place from the commencement of the contract right to the Final Statement, in that the Engineer monitors and supervises the construction of the project and is thus in a position to know that the project has been built in accordance with the Contract. He can confirm or deny that the Contractor has used workmanship and materials conforming to the Contract, and has carried out measured amounts of work, valued according to the Contract. To be in this important position the Engineer relies on information and records compiled by his supervisory team on site headed by the Engineer's Representative.

2 ROLE OF THE ENGINEER IN ACCEPTANCE OF WORK

From the acceptance of the style of offices for occupation by the Engineer's Representative, or the Performance Guarantee, to the last inspections of remedied defects and the Final Certificate, the Engineer's staff on site monitors all matters to do with the project, as defined under the Contract. They are the ears and eyes and in some cases the muscles on which the Engineer relies, to be able to function in his capacity as Engineer.

Sometimes the Engineer acts as the agent of the Employer, but in FIDIC Clause 2.6 he is to be impartial in dealing with matters between the Contractor and the Employer. In matters to do with Acceptance of the Works, the Engineer probably acts as the agent of the Employer, but could be said to be impartial when issuing the Taking-Over Certificate. This is all a matter of debate and does not really alter what is required of the Engineer in matters relating to acceptance. His responsibilities are broad, from the monitoring and acceptance of detail on site, to the issue of the Final Certificate and Account. The ultimate acts of acceptance, however, are described in clauses 48.1, 2, & 3 and 61.1, 62.1 & of FIDIC.

The World Bank's Standard Bidding Documents modify Sub-Clause 2.1 of FIDIC insofar as the Engineer has to obtain the approval of the Employer before taking certain specified actions – which could be viewed as limiting the power of the Engineer. ERA contracts impose further restrictions, which although primarily aimed at keeping the Employer informed of the financial status of the Contract, also require the Engineer to obtain the approval of the Employer before issuing any taking-over certificate. To be able to give this approval the Employer must have a watching brief, which is not allowed for in FIDIC. It is important that the Employer is not seen to be involved with the Engineer's responsibilities, except as stated in the Contract. If there are disputes, the case of the Employer would be weakened if the Contractor could prove that interference took place and the Engineer was not seen to be impartial.

It is believed, however, that this watching brief can be fulfilled by making documentation available to the Employer's staff. A representative of the Employer will accompany the Engineer or his representative when the inspections required by the Contract are carried out. He would be able to give his approval (or otherwise) to the Engineer's findings as required by the Contract, without interfering with the Engineer's negotiations with the Contractor.

3 PRINCIPAL CLAUSES OF FIDIC CONCERNED WITH ACCEPTANCE OF WORK

3.1 Sub-Clause 48.1 Taking-Over Certificate

When the whole of the Works have been substantially completed and have satisfactorily passed any tests on completion prescribed by the Contract, the Contractor may give notice to that effect to the Engineer, with a copy to the Employer, accompanied by a written undertaking to finish, with due expedition, any outstanding work during the Defects Liability Period. Such notice and undertaking shall be a request by the Contractor for the Engineer to issue a Taking-over Certificate in respect of the Works. The Engineer shall, within 21 days of the date of delivery of such notice, either issue to the Contractor, with a copy to the Employer, a Taking-Over Certificate, stating the date on which, in his opinion, the Works were substantially completed in accordance with the Contract, or give instructions in writing to the Contractor specifying all the work which, in the Engineer's opinion, is required to be completed by the Contractor before the issue of such Certificate. [As discussed in Section 2.0 many ERA contracts amend FIDIC's clause 2.1 and in relation to sub-clause 48.1 require the Employer's approval prior to the Engineer issuing any Taking-Over Certificate.] The Engineer shall also notify the Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive the Taking-Over Certificate within 21 days of completion, to the satisfaction of the Engineer, of the Works as specified and remedying any defects so notified.

3.2 Sub-Clause 48.2 Taking Over of Sections or Parts

Similarly, in accordance with the procedure set out in Sub-Clause 48.1, the Contractor may request and the Engineer shall issue a Taking -Over Certificate in respect of:

- a) any section in respect of which a separate Time for Completion is provided in the Appendix to Tender,*
- b) any substantial part of the Permanent Works which has been both completed to the satisfaction of the Engineer and, otherwise than as provided for in the Contract, occupied or used by the Employer, or*
- c) any part of the Permanent Works which the Employer has elected to occupy or use prior to completion (where such prior occupation or use is not provided for in the Contract or has not been agreed by the Contractor as a temporary measure).*

3.3 Sub-Clause 48.3 Substantial Completion of Parts

If any part of the Permanent Works has been substantially completed and has satisfactorily passed any Tests on Completion prescribed by the Contract, the Engineer may issue a Taking-Over Certificate in respect of that part of the Permanent Works before completion of the whole of the Works and, upon the issue of such Certificate, the Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in that part of the Permanent Works during the Defects Liability Period.

3.4 Sub-Clause 48.4 Surfaces Requiring Reinstatement

Provided that a Taking-Over Certificate given in respect of any Section or part of the Permanent Works before completion of the whole of the Works shall not be deemed to certify completion of any ground or surfaces requiring reinstatement, unless such Taking-Over Certificate shall expressly so state.

3.5 Sub-Clause 49.2 Completion of Outstanding Work and Remedying Defects

To the intent that the Works shall, at or as soon as practicable after the expiration of the Defects Liability Period, be delivered to the Employer in the condition required by the Contract, fair wear and tear excepted, to the satisfaction of the Engineer, the Contractor shall:

- a) *complete the work, if any, outstanding on the date stated in the Taking-Over Certificate as soon as practicable after such a date, and*
- b) *execute all such work of amendment, reconstruction, and remedying defects, shrinkages or other faults as the Engineer may, during the Defects Liability Period or within 14 days after its expiration, as a result of an inspection made by or on the behalf of the Engineer prior to its expiration, instruct the Contractor to execute.*

3.6 Sub-Clause 61.1 Approval only by Defects Liability Certificate

Only the Defects Liability Certificate, referred to in Clause 62, shall be deemed to constitute approval of the Works.

Although this sounds ominous for the Contractor it is considered that what is meant by this sub-clause is that any **defective** work becoming evident prior to the issue of the Defects Liability Certificate (DLC) – even if approved previously – should be corrected by the Contractor.

3.7 Sub-Clause 62.1 Defects Liability Certificate

The Contract shall not be considered as completed until a Defects Liability Certificate shall have been signed by the Engineer and delivered to the Employer, with a copy to the Contractor, stating the date on which the Contractor shall have completed his obligations to execute and complete the Works and remedy any defects therein to the Engineer's satisfaction. The Defects Liability Certificate shall be given by the Engineer within 28 days after the expiration of the Defects Liability Period, or, if different defects liability periods shall become applicable to different Sections or parts of the Permanent Works, the expiration of the latest such period, or as soon thereafter as any works instructed, pursuant to Clause 49 and 50, have been completed to the satisfaction of the Engineer. Provided that the issue of the Defects Liability Certificate shall not be a condition precedent to payment to the Contractor of the second portion of the Retention Money in accordance with the conditions set out in Sub-Clause 60.3.

The question of latent defects that may become evident **after** the issue of the DLC. is an interesting one. Theoretically it should be assumed that on the issue of the DLC. the Contractor is relieved of any further obligations on the contract. However, if defects manifest themselves after this time it is considered that the Employer still has recourse to have them corrected. It would, of course, have to be proved that such was caused by bad workmanship or non-compliance with the specification and can therefore be regarded as a breach of contract. It is argued then that the Employer can request that an arbitrator, or the Engineer, reviews any such latent defect at any time until the applicable law deems the Contractor's liabilities to have ceased.

4. CRITERIA TO ALLOW ACCEPTANCE OF WORK

The criteria on which the Engineer can accept work are defined and are included in the whole of the Contract, but particularly in the Conditions of Contract and the Specification (including the Conditions of Particular Application, as well as Project Specifications) and the Bill of Quantities.

A list of items to be completed satisfactorily would include:-

- i) All materials, plant and workmanship shall be of the kind described in the Contract and in accordance with the Engineer's instructions (Clause 36.1).
- ii) Work to be to specification and any special conditions as to the method of construction.

- iii) Work satisfactorily passing tests required by the contract sub-clauses 36.1, 2 & 3, and any special tests as in Sub-clauses 36.4 & 5. These tests will be defined in the Specification or possibly on the drawings, but the Engineer can impose his own regime, if he considers fit.
- iv) Work to be to the correct line and level, as required by the drawings.
- v) Work to be without defects or imperfections.
- vi) Work to include all details and incorporate all features as shown on the drawings.

5. MATERIALS, PLANT AND WORKMANSHIP

From the criteria listed in Section 4 some comments could be made.

5.1 Materials

The characteristics of materials referred to here are those that cannot be easily defined or measured by a test on site, but could be named in the specification or on a drawing. Examples would be: -

- a) in some specifications broken masonry may be acceptable instead of crushed stone for base course.
- b) red sandstone for cladding (say) is characteristic of type and colour of stone that may be important in buildings and for structures on motorways.
- c) rapid setting cement for use in defeating an ingress of water in grouting, this would be defined by name and specification.
- d) special types of bitumen that would be defined by specification, where it is unlikely that a site would have the facilities to carry out tests.

5.2 Plant

Plant must possess characteristics which make it suitable for the work it has to undertake.

A small excavator is agile and needs less room to work in confined spaces, but its production will be inferior to a large machine on open work. A grader must be the right size. A large grader is not so manoeuvrable, unable to turn in a tight place on say a mountain road, yet a small one may not achieve the production needed on open work.

This is matter which is usually left to the Contractor. It may be that a contractor has a lack of continuity for the actual plant which would be most suitable, so he may prefer to use what he has on site (which may be the wrong size or type) for a short time. This is his decision and providing the resultant work passes all the tests and requirements, it is usually not a matter for the Engineer or his staff, except to note and keep a record, unless production is slow or the tests are unsatisfactory.

In some operations an item of plant of a specific size, power, or suitability must be used, as defined in the specification, and it would always be the task of the supervisory team to check that the Contractor used plant to the specification.

Examples would be: -

- a) Roller types and weight to produce a certain compaction, in a certain type of material, e.g. sand, asphalt, bitumen/ aggregate surfacing. A large roller could not compact close to a structure or pipe, and would thus be unsuitable for that work. A small pavement roller would be swamped if trying to compact fill in an open embankment.
- b) To prove rock, some specifications require a tracked machine of a certain weight and horsepower fitted with a ripper blade. To use a smaller or larger machine would not be conforming to the specification.

- c) Concrete and grout mixers have to be suitable for the work they are to carry out, and sometimes their details are included in specifications and Bills of Quantities. Usually, however, the words such as “of suitable size and power “are used. For instance a small mixer would make a most unsatisfactory job of a bridge deck.
- d) Road pavers are designed for specific operations and are sometimes required to be a certain type and size etc. This may be important to deal with the type of material to be laid and achieve the required compaction; an alternative machine might produce unsatisfactory results.

5.3 Workmanship

This could be defined as the correct use of the right materials, plant and equipment, with labour of sufficient skills to produce work to specification; but this is too broad. In 5.2 above we have seen how the correct use of plant is important and clearly the correct type of materials should also be used.

All other things being equal (i.e. materials, plant, labour and weather) good workmanship should produce a product: -

- without defects ,
- to programme, and
- with the least waste of resources,
- at the first attempt to construct.

In Appendix A there is a list of items which constitute good workmanship.

6 WORK TO BE TO SPECIFICATION AND TO ANY SPECIAL METHOD OF CONSTRUCTION

Work must always be to specification and any special conditions as to the method of construction. This depends on the specific project under construction.

All specifications, in conjunction with the Bill of Quantities, drawings and perhaps conditions of contract, give instructions and details on how the work is to be constructed in order to conform to the contract. For instance, for earthworks and pavement layers:

- a) the definition of suitable material
- b) layers of material and their compaction
- c) the tests required
- d) the finish of the final layer
- e) the levels and position of the layers

Special conditions as to the method of construction might be:-

- a) the use of slip form, say, to avoid construction joints in a water retaining structure
- b) the use of special methods of shuttering to eliminate bolt holes, or to give a particular style to the face of the finished concrete (for water retaining structures or to enhance the aesthetic appeal of the work)
- c) the use of a paving machine to lay certain materials
- d) the use of a pneumatic tyred roller to finish bitumen surfacing
- e) the use of a recycling machine to refurbish old pavements
- f) chemical, cement or lime stabilisation of road bed etc might need special plant

7. COMPLETION OF TESTS

7.1 General

As stated in FIDIC sub-clauses 36.1, 2 & 3, all tests and special tests as in sub-clauses 36.4 & 5. have to be passed satisfactorily. These tests will be defined in the Specification in conjunction with the Bill of Quantities, or possibly the drawings, but the Engineer can impose his own testing regime.

The responsibility for materials and testing and the cost of the tests required is quite clearly the Contractor's in all conditions of contract, to the direction and satisfaction of the Engineer.

Usually it will be the responsibility of an Assistant Engineer in the Engineer's Representative's (ER) team, to supervise and record the testing procedure, though on some projects a senior technician might be appointed to do this. However, the responsibility for the acceptance of the tests and that they conform to specification will always be the Engineer's. Even if his powers are delegated to the Engineer's Representative, the Engineer can overturn any decision by the ER, even though he is not present on site on a day to day basis.

All the tests will be carried out in accordance with the specification included in the contract documents, which will probably indicate the type of test required and refer to, for instance, the relative American Standard (AASHTO, or ASTM), British (BS), South African (CSRA, SABS) which will specify all test details, the apparatus needed, the procedure, the data and method of recording.

For example, in the ERA Specification there is a section, Series 10000 which covers quality assurance and testing in great detail and also specifies that the cost of testing must be included in the rates. Even if this specification is not used, similar requirements will apply in almost any other specification. Thus it is usually quite clear what is required with regards to testing materials and the incorporation of the materials into the Works.

The Contractor normally supplies the laboratory, the testing machines and facilities (paid under a preliminary item), the technical staff, the transport and the labour. The Contractor's laboratory staff undertakes testing so that work can progress. If the Engineer has a laboratory on site, his staff usually undertake check tests, which often form the acceptance tests. If either party does not set up his own testing regime he must accept the results of the tests carried out on his behalf by the other party.

In any case the Engineer's staff must supervise and observe all the testing procedures. They must keep detailed records of the tests, the location of the sampling point, the date, time and possibly weather conditions and correlate them with the testing requirements and any possible resultant problems or repercussions.

Generally it is not the results of the tests that cause problems, but the time taken to produce them and to obtain the Engineer's acceptance that the work is to specification.

There are four types of routine tests which are useful to discuss: -

- i) Routine acceptance tests. The tests on material before or when it is brought to site
- ii) Testing of materials in the road bed or occurring in the road prism. Tests on the original ground, in excavations and/or when the formation is uncovered.
- iii) Testing of imported materials when they are in place.
- iv) Tests to confirm dimensions such as thickness of layer, level and position of layer, feature, or structure.

Sub-clauses 36.4 & 36.5 direct how the “cost of tests not provided for” is to be allocated. These may be of the type where, say, a pre-cast concrete unit is tested to destruction (providing such tests were not part of the procurement procedure).

In many specifications, the results of tests are incorporated in a statistical method of calculating conformity. This is to deal with the results of single tests of non conformity in a true light, compared to a greater number of acceptable tests. The review of test results by these methods is subject to the acceptance and approval of the Engineer and his delegated staff. The responsibility for producing the review and the tests remains with the Contractor.

7.2 Routine acceptance tests

The tests before materials are brought to site are routine and the Contractor would be well advised to carry them out and have the results before they are brought to site. Materials obtained commercially are fairly simple; the Contractor will require the supplier or sub-contractor to carry out the tests to the satisfaction of the Engineer. This should ensure that the Contractor does not have to pay for or dispose of rejected materials. If he is wise, the main Contractor will have made it the responsibility of the supplier to supply materials to specification.

Tests of material from borrow pits must be routine. Whenever a change in quality is detected quick action is required. The reaction of the Contractor to obtaining test results must be as quick as can be arranged and the testing process must be just as reactive. Even if the Engineer’s staff on site locate the borrow pit etc. and carry out the testing, the Contractor is not relieved of the responsibility for providing materials to specification. If material is included in the Works that has to be removed, the Contractor must pay for its removal and replacement. This can result in disputes; for instance where a borrow pit fails to yield material of high enough standard, or is expensive to work, due to some incident outside the control of the Contractor (i.e. the weather).

7.3 Testing of materials in road bed or occurring in the road prism

On some contracts the Engineer is committed to issuing instructions as to the use of materials that occur in the road bed or road prism. He must define whether or not they are unsuitable (in which case he will direct that they are taken to spoil) or suitable, which means they can be used in the Works. If they are not needed for the Works, then he will give instructions and pay for their disposal.

Tests for suitable materials in road bed or road prism would include CBR and plasticity as well as grading, moisture content etc. These tests can take several days to obtain results.

If sufficient tests have been carried out before work commences the suitability of the soils may (and should) be known. The Contractor will want a decision from the Engineer’s staff whether the material is suitable for use in the Works, before work can commence. The solution to this is for the Engineer’s staff to be in front of the Contractor with the information, well informed of the condition and quality of the soil throughout the Works, before the Contractor needs the information. Thus the Engineer’s Representative on site will be able to make an early decision and give an instruction well in time.

It is a point to remember that the Contractor is responsible for keeping the materials in a sound condition. If he allows suitable material to become unsuitable, say too wet to place and compact, he is responsible for drying it out to be fit for purpose, at his expense.

7.4 Testing of imported materials in place

Common tests for materials in place are largely compaction and moisture content for soils; workability, strength and water content in the case of fresh concrete.

With reference to soils, whether fill, sub base or base, if they are laid in succeeding layers the Contractor will want to know the test results quickly, so that he can lay the next layer as soon as possible.

The solution to this is for the testing to be carried out by a rapid testing method, say by a nuclear density gauge, but failing this, it is worth making the point that the Contractor is responsible for tests and should have allowed time for them in his tender. He should have allowed for any interval in the work required by the testing to produce results.

The Engineer cannot accept work if the results of tests are not available to him, or do not conform to what is required. However, once acceptable test results are available the Engineer or his Representative should not delay in accepting the work, and informing the Contractor.

7.5 Tests to confirm dimensions

The tests on layers of formation are concerned with the position of the layer vertically and horizontally and also the thickness of the layer. They therefore involve setting out (as discussed in Section 8 below), but in some specifications a statistical approach is taken where random levels are taken on the layers to assess the thickness and also the setting out of the camber and position of the edge of the road. This requires the services of a surveyor, and also a familiarity with the statistical methods, in order that the tests prove the top of the layer is satisfactory.

8. SETTING OUT

Each section and/or subsection of the Works has to be to the correct line and level, as required by the drawings. This is carried out by first establishing a system of points on the ground related for position and level, in other words a survey carried out by a surveyor trained in the use of survey techniques and the use of instruments. From these points the road can be set out using survey pegs and boards to often denote the centre line of the road and the levels.

The correctness of the original survey is the responsibility of the Engineer, the work of checking that survey and setting out the road for line and level is the Contractor's.

The Engineer's staff on site is wise if they check the work of the Contractor's surveyor and thus agree the setting out.

The Contractor will use stakes and boards to guide him in the dimensions and levels of the work he is constructing, to ensure it is as shown on the drawings. The Engineer's staff will use the boards and stakes to check that the Contractor's work is in the right position and to the right level.

Usually the original survey is the work of a surveyor employed by the Employer, often in a previous design commission. The task of checking the Contractor's dimensions of permanent work could be by the same surveyor, but it is more likely to be one of the Engineer's site staff.

9. DEFECTS OR IMPERFECTIONS

Defects or imperfections can occur in all sections of work, and may be the result of bad workmanship during construction, lack of attention to detail, or the finishing of work. In many cases an otherwise sound section of work is marred by defects which are quite small, compared to the section as a whole, and thus the Contractor is asked to remedy the defect without removing the whole section.

If the defects are of a major nature and size it is best for the whole work section to be rejected and replaced. If the defects indicate a potentially serious situation, such as cracks in concrete or earth embankments and slopes, they may have a serious implication if not repaired adequately.

Whatever the defect, it should be reported to the Engineer, investigated (by either the Engineer's staff or the Contractor's staff) and repaired by the Contractor before the end of the Defects Liability Period.

It would be impossible to list all defects and imperfections that might occur when finishing a contract but some are included in a list in Appendix 2.

The Engineer's staff on site, led by the Engineer's Representative, must investigate all defects and imperfections to ascertain how they occurred, who is responsible, and take steps to eradicate the defect by a permanent cure.

10. INCORPORATION OF ALL DETAILS AND FEATURES

All details and all features as shown on the drawings must be incorporated in the Works. These might include: -

- a) built-in items in concrete for brackets, and fixings
- b) marker posts for drainage or service lines
- c) handrails finished and painted
- d) fences finished and all gates
- e) accesses to houses and features
- f) turnouts into side roads/ other roads finished as indicated on drawings
- g) masonry walls pointed and joints filled

11 THE MANAGEMENT OF CRITERIA FOR ACCEPTANCE OF A PROJECT

The criteria for acceptance were defined in previous sections of this guideline, and the ER's staff uses these criteria to ensure that the work does indeed conform to the Contract. They also keep records on a routine basis, as well as special records of incidents which may become contractual.

In Appendix A list of activities or operations is given showing good workmanship and operations that require supervision by the Engineer's staff. It is not the purpose of this guideline to define the manner in which good management of the supervisory team can be achieved.

The ER may not be out on site all the time but he should be available to resolve a difficulty or observe some unusual occurrence, if necessary. His Assistant Engineer's would be on site to a greater extent, but the staff usually involved in supervising and monitoring the day-to-day activities would be the inspectors, sometimes called Clerk of Works. They should be on site most of the time. Thus the Clerk of Works' and the Assistant Engineers should co-operate to make sure members of the ER's staff are monitoring the Contractor's activities during all working hours.

These personnel should keep diaries and prepare daily reports as a record of operations and in sufficient detail so that the major features of the work are logged. Their reports should be transferred to the ER's main files for safe keeping as soon as possible, with a copy to the ER.

The Clerk of Works should be responsible for checking that the Contractor's returns of labour, plant and materials submitted to the ER (as required by the Contract) are correct and a true record.

A Surveyor or Assistant Engineer would generally be responsible for checking the setting out of work, concrete foundations to bridges, fence or kerb lines and levels on layer work. However, the Clerk of Works may carry out checks on layers and kerbs from the setting out stakes and boards. The Clerk of Works could also be responsible for making sure the soils technicians attend the site in good time to carryout the necessary tests.

It is useful to establish a routine of site sheets being signed by the Clerk of Works (or one of the Assistant RE's), certifying that he has checked the work and that further work can continue. These are often called "Work approval forms" and are written in triplicate. They should be presented by the Contractor (foreman or supervisor) and signed by the ER's staff before new work covers the old.

If a quality assurance scheme/ routine is established on the site, then work approval forms may be reinforced by more detailed sheets recording the checks of the individual features of the work the Clerk of Works may verify as correct. In addition, a good plan is to design charts which give a visual record of the approved work.

All these are a function of management by the ER. He must be aware that the checks and tests he has instituted are being made and that records are being kept, so he can quickly see if things are going well or if he needs to take decisions or action as to future monitoring and supervising.

12 ACCEPTANCE BY THE ENGINEER

Throughout the construction period and the Defects Liability Period, the ER's staff will have been monitoring the work and recording that the detail is correct, in other words the whole of the Works conforms to the contract.

If there is a query, incidents affecting the road, the ER's staff should be able to consult their records and give a sound opinion of why the damage, etc. has occurred. Thus when the work reaches completion they can make recommendations to the Engineer as to his actions i.e. whether to accept the Works on behalf of the Employer or which sections need further attention.

This supervision and consequent acceptance of work by the Engineer's Representative and his staff is a process which allows the Engineer to accept, on behalf of the Employer, that the whole or parts of the Works are complete and conforming to the Contract. The penultimate acceptance is when the Engineer issues the Taking-Over Certificate, which denotes the substantial completion of the contract and the start of the Defects Liability Period. This is the stage where the Employer 'takes over' the Works.

Final acceptance is when the Engineer issues a Defects Liability Certificate. This depends on the Contractor having completed all work and having remedied all defects, following an inspection made by or on behalf of the Engineer prior to the expiration of the Defects Liability Period.

13 A SCHEDULE OF THE COMPLETION STAGES

- Stage 1** The work is moving to completion as the Contractor produces satisfactory work, ideally repairing defects as he goes, receiving payment through statements and interim certificates.
- Stage 2** The Contractor gives notice to the Engineer; copy to the Employer, stating that the Works have been substantially completed and have satisfactorily passed the Tests on Completion required by the Contract. The Contractor undertakes to finish any outstanding works during the Defects Liability Period.
- Stage 3** The letter from the Contractor in Stage 2 is deemed by the Engineer to be a request for the issue of a Taking over Certificate. The Engineer inspects the Works (usually with Contractor) and the Employer observes and agrees/disagrees with the Engineers conclusions. The process may have to be repeated if the Employer does not approve of the Engineer's actions (ERA contracts).
- Stage 4** Within 21 days after the notice in Stage 2

EITHER

The Engineer certifies the date of substantial completion and issues the Taking over Certificate (TOC), plus a schedule of outstanding work to be completed in the Defects Liability Period.

OR

The Engineer refuses to issue substantial completion and thus the TOC, but issues a schedule of work required to be completed, before substantial completion can be deemed to be granted and the TOC can be issued.

- Stage 5** The above process is repeated until the TOC is issued.
- Stage 6** The date of the certification of the substantial completion records the start of Defects Liability Period (DLP). During the DLP the Contractor will complete all outstanding work, repair all known defects and defects that become evident during the DLP.
- Stage 7** During the DLP, not later than 84 days after the issue of the TOC for the whole of the Works, (FIDIC Sub-Clause 60.5, SBD Sub- Clause 60.10) the Contractor shall submit to the Engineer a Statement at Completion with supporting documents showing in detail, in the form approved by the Engineer:-
- the final value of all work done in accordance with the Contract up to the date stated in the TOC,
 - any further sums which the Contractor considers to be due to him, and
 - an estimate of amounts which the Contractor considers will become due to him under the Contract.
- Stage 8** The end of DLP is the date of the end of the period specified in the Appendix to the Bid, commencing at the date of substantial completion.

Before the end of the DLP or within 14 days of the end of the DLP the Engineer will inspect the site (usually with the Contractor and the Employer) and will instruct the Contractor to execute all work of amendment, reconstruction and remedying of defects and the Contractor will execute this work. This will be instructed in the form of a schedule of outstanding work to be completed before the Defects Liability Certificate (DLC.) can be issued.

- Stage 9** If all remedial and amended work has been completed to the Engineer's satisfaction, then the DLC will be issued within 28 days after the expiry of the Defects Liability Period, or if there are different defects liability periods at the expiration of the latest such period. The Contract is then considered as complete.

Note: FIDIC Sub-Clause 61.1 states that only the Defects Liability Certificate, referred to in Sub-Clause 62, shall be deemed to constitute approval of the Works.

Note also Sub-Clause 62.2 Unfulfilled Obligations.

- Stage 10** Not later than 56 days after the issue of DLC. the Contractor shall submit to the Engineer for consideration a Draft Final Statement with supporting documents, showing in detail, in the form approved by the Engineer:-
- the value of all work done in accordance with the Contract and
 - any further sums which the Contractor considers to be due to him under the Contract.

The Contractor will also give to the Employer, with a copy to the Engineer, a written discharge confirming that the total of the Final Statement represents full and final settlement of all monies due to the Contractor arising out of the Contract.

Stage 11 Within 28 days after the receipt of the Final Statement and discharge the Engineer shall issue to the Employer, copy to the Contractor, a Final Certificate stating:-

- the amount which, in the opinion of the Engineer , is finally due under the Contract, and
- after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled under the Contract, other than Clause 47, the balance, if any, due from the Employer to the Contractor or from the Contractor to the Employer as the case may be.

The remaining half of the retention money is released to the Contractor at the end of the DLP, unless there are other factors to be considered, such as are given in Clause 60.3, where cash can be retained by the Engineer to pay for remedial works as he considers fit.

NOTES:

Note 1

If substantial completion is given for a part of the Works, then separate TOC's will be issued for each part or section accepted as substantially complete, thus there will be several DLP's, - i.e. one for each section. The date of the start of the DLP for the whole project will date from the issue of the last certificate of substantial completion. Thus it follows that the date of commencement of the time period in Stage 7 and onwards will date from the start of the last DLP for the whole project.

Note 2

Stage 10 and 11 may be modified or disrupted by the introduction of claims submitted by the Contractor to the Engineer but not agreed. If the Contractor wishes to pursue these claims then these stages may be delayed, even for several years.

Note 3

Sometimes if the Contractor is international he may not want to leave staff on site during the Defects Liability Period. He will want to demobilise as soon as the TOC is issued. The Contractor may then negotiate for the Employer to carry out this work on his behalf, or seek the services of a local contractor. The negotiations as to inspections and payment, however, will always have to be made/supervised by the Contractor's senior staff, but possibly during short site visits. Any financial arrangements shall be agreed before retention is released or by other suitable means.

Note 4

Under FIDIC the Performance Security is to be effective until the end of the **Defects Liability Period**. In the SBD this validity ceases 28 days after the issue of the **Taking-Over Certificate**. It is considered that the latter is more acceptable, as the Contractor will have 'performed'; otherwise the Taking over Certificate should not be issued.

Appendix 1 Good Workmanship and Operations which require Supervision and Recording by the Engineer's Supervisory Team.

Proper road diversions and control of traffic both public and construction is required throughout the period of the works. This would include the use of signs watchmen, flagmen etc as necessary. Even a new road through virgin country areas need to be barriered off to avoid damage to the works from trespassers, animals and illegal traffic.

Clearing and grubbing

- a) Demolishing of all masonry, brickwork etc. into a state fit to go to tip (disposal area or area where unsuitable material is stored).
- b) Removing all trees and their roots to a depth as specified.
- c) Removing all debris and disposing to tip.
- d) Levelling off the ground in order to prevent flooding and damage by trespass.

Drainage

- e) Working a drain from the low end so that the water always flows away from the work point.
- f) Regular checking of the bottom (the invert) of a drainage trench so that the bedding material can be properly laid on compacted original ground, without contamination of the bedding material.
- g) Drainage pipes or culverts are laid on the properly compacted specified bedding material.
- h) Drainage units are laid to position, slope, and inline vertically and horizontally, without open joints.
- i) All joints to pipes are properly made with the specified materials.
- j) Backfill to drainage is of the specified type, properly compacted with the correct machinery (pedestrian roller, compactor plate, rammer etc.).

Earthworks

- h) The use of sufficient pumps and temporary drainage (digging small channels) to deal with water, to prevent the work slowing down and damage to the work area.
- i) Always working and leaving work within the road prism graded, compacted and smooth, so it is self draining and will suffer the smallest amount of damage in the event of a storm or trespass.
- j) The regular checking of levels and positions of cut and fill from the setting out, to ensure proper control of the earthworks.
- k) Ensuring that construction traffic uses the road prism to a minimum.
- l) Constructing bypasses, erecting barriers to prevent damage to the road bed or finished layers of fill.
- m) If fill material cannot be immediately placed in the Works, stockpiling the material and/or levelling off to prevent damage by weather or traffic.

Structures

- n) Using concrete blinding at the bottom of an excavation for a structure, whether it is shown on the drawings or not.
- o) Ensuring that the blinding in (p) is clean, washed and free of all deleterious material, before placing reinforcement or fresh concrete on its surface.
- p) Ensuring that reinforcement is properly tied, supported, blocked, fixed in position and free from dirt or rust; and of course that the right number and size of bars are incorporated.
- q) Good shuttering arrangements (properly formed, rigid, fixed, strutted and concrete tight), which will produce a concrete surface that is true, flat, in the right position and of the correct size.
- r) Ensuring that proper vibratory plant is available and working before concreting is commenced.

- s) Ensuring that the supply of concrete is suitable to the size of pour, and amending the pour or supply to suit if necessary (to prevent under/ over vibration and /or cold joints).
- t) Ensuring there are adequate ways to place the concrete without pushing it with the vibrators.
- u) Concreting in such a manner as to ensure that cold joints or honeycombing does not develop, and that all the concrete is properly compacted.
- v) Covering newly placed concrete to protect it from extreme temperatures (sun or cold), and ensure it is kept wet for the time required in the specification, in order to cure and gain strength satisfactorily.
- w) Roughen or scabble and clean the concrete of a previous pour before placing concrete.

Road Formation

- x) When working on the road formation, closing off the road bed (if possible) or working half and half, to ensure traffic does not damage the work.
- y) Alternatively, opening a temporary by-pass to control traffic during construction, with all necessary signs, watchmen and flagmen.
- z) Avoid stacking new material for the road formation and leaving in heaps.
- aa) Cleaning the road bed or previous layer of formation material only as needed for the days production.
- bb) Compacting each layer as it is laid so that no material is left over night un-compacted.
- cc) Checking regularly from the setting out to make sure the layer is to the right height and thickness
- dd) When laying surfacing, close off the base course layer to traffic using proper diversions signs watchmen and flagmen, clean the base course layer, water and re-compact just before laying prime.

Surfacing

- ee) All surfacing work requires the proper control of traffic, denying areas to all traffic, and controlling both the construction traffic and public traffic to avoid damage to the work.
- ff) Similarly deal with the prime surface the same way as in (gg), repairing the prime in good time to allow work to progress.
- gg) If the lorries have to be turned around (make several journeys) ensure that each lorry knows what is expected of him. i.e. has full instructions, and plan the amount of work expected.
- hh) When surfacing, ensure there is no delay between lorries supplying the materials for the section planned (to avoid cooling of materials, whether bitumen/aggregate or asphalt).
- ii) That all necessary plant, labour, tools and facilities are present at the work site before the start of work.
- jj) Keep the road closed to traffic for as long as possible, until bitumen materials have cooled (Note: once the bitumen has cooled, traffic will probably improve the results), or to specification or as directed by the Engineer.
- kk) Ensure rollers keep working until bitumen has cooled, or as directed by the specification.

Appendix 2 Defects and Imperfections

The following list comprises situations which require action by the ER's staff (and thus the Contractor) before the end of the Defects Liability Period. It should be remembered that investigations should be made as to why and how the defects occurred. This is important to be able to assess who is responsible for the defect (Employer or Contractor) and make sure that the reason for the defect is eliminated so that it cannot occur again during the life span of the road.

- a) soft spots in a carriageway
- b) badly compacted edge to an embankment or road formation
- c) cracks in embankments or road surface
- d) inadequate site clearance after construction
- e) badly finished landscaping
- f) water standing or running within the road prism, not being picked up by the drainage
- g) pools of water anywhere denoting inefficient drainage or spring, need for sub surface drainage
- h) pools of water on carriageway denoting imperfect slopes to road bed or surfacing
- i) depressions across the carriageway over, for example, a drain line, denoting bad backfill and compaction over drain
- j) ruts and pot holes in surfacing damaged by traffic
- k) lack of line in a kerb
- l) kerbs not to detail
- m) kerbs not fixed in position
- n) kerbs and/or similar, chipped and damaged by construction traffic
- o) imperfectly positioned and erected features such as road signs, posts and guard rails
- p) guard rail posts not properly compacted or concreted
- q) manholes to drainage or services not finished
- r) headwalls not complete
- s) catch pits not complete
- t) ducts for services not cleaned and finished
- u) regime for testing of concrete reveals concrete failing to conform to the specified test
- v) unsound or honeycombed concrete
- w) concrete surfaces cleaned of all loose grout and dirt etc
- x) damage by construction or traffic, or any other cause.

Appendix 3 Suggested Forms.

TAKING OVER CERTIFICATE

To: (Contractor) cc: (Employer)

From: (Engineer)

CONTRACT:

CONTRACT NO.:

WORKS SUBSTANTIALLY COMPLETE

Section _____

Length _____

Date of notice from Contractor _____

Date of Inspection _____

Date of Substantial Completion _____

Duration of Defects Liability Period _____

Date of expiry of Defects Liability Period _____

The certificate is issued in accordance with the provisions of Clause 48 of the General Conditions of Contract and certifies that the Section of the Works as detailed above was substantially completed on _____.

The Contractor _____ undertakes to complete with due expedition any outstanding work during the Defects Liability Period, including those works listed in the attached Schedule of Outstanding Works, and to fulfil all obligations specified under the provisions of clauses 49 and 50 of the General Conditions of Contract.

SIGNED

SIGNED

Contractor

Engineer

S
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/

SCHEDULE OF OUTSTANDING WORK AT TIME OF SUBSTANTIAL COMPLETION/FINAL COMPLETION /1

CONTRACT OF INSPECTION _____ **DATE** _____
SECTION OF WORKS INSPECTED _____

Substantial completion date _____ Defects Liability Period _____ Expiry of Defects Liability Period _____

Location	Defective (D), Outstanding (O) or Additional (A) Works Required	Works Category D, O or A	Estimated Quantity	Unit of Measure	Pay Item (if any)	Date Subsequently Completed to Satisfaction of the Eng.	Actual Quantity	Unit of Measure	Pay Item (if any)
Signed by the Engineer: Name: _____ Dated: _____					Signed as agreed for ERA: Name: _____ Dated: _____				
Signed on receipt by the Contractor's Representative: Name: _____ Dated: _____									

1/ Delete, as appropriate, to show whether this schedule relates to Substantial or Final Completion.
 2/ At the time of issuing the above Schedule of Works the last 5 columns should be left blank, for subsequent completion when the Works are completed/verified completed.

DEFECTS LIABILITY CERTIFICATE

To: (Employer) cc: (Contractor)

From: (Engineer)

CONTRACT:

CONTRACT NO.:

Date of Inspection _____

Last Date of Substantial Completion _____

Defects Liability Period _____

Date of expiry of Defects Liability Period _____

This is to certify that pursuant to Clause 62 of the General Conditions of Contract on _____

the Contractor _____ completed his obligations to execute and complete the Works and remedy any defects therein to the Engineer's satisfaction.

SIGNED

Engineer

SUBSTANTIAL COMPLETION INSPECTION REPORT**MEMORANDUM**

To: Contract Administration Division Manager

cc:

From: Signed:

Date:

Ref.:

Re.: Contract:

Section of the Works:

As directed, the above signed representative of the Employer (ERA) attended the Engineer's Inspection of the Works in response to the Contractor's formal notice of Substantial Completion and associated request for the Engineer to issue a Taking-Over Certificate in accordance with the Conditions of Contract. I hereby confirm that with our agreement the Engineer did/did not* issue the said Taking-Over Certificate in respect of the above section of the Works and issued the attached Schedule of Works required to be expeditiously completed by the Contractor before the Works would be accepted as substantially complete within the Defects Liability Period*. Where appropriate, the Schedule of Works also shows the date of substantial completion and the expiry date of the Defects Liability Period, when Final Inspection will be due.

Outstanding works of particular significance to the inspection team are highlighted on the actual Schedule of Works and detailed for management attention/action on the following summary sheet.

The Engineer's formal response to the Contractor is also attached, together with a copy of the Contractor's formal request.

Finally, please also find herewith a separate duly completed standard inspection report regarding the contract as a whole.

*
Delete as appropriate.

**OUTSTANDING WORKS OF PARTICULAR SIGNIFICANCE –
AT SUBSTANTIAL/FINAL COMPLETION /1**

Contract:

Substantial Completion Date:

Section of the Works Inspected:

Defects Liability Period:

Inspection Date:

Expiry Date of Defects Liability Period:

Page No.	Item No.	Points of Particular Interest (requiring attention/action as shown	Referred for info only	Referred for Action

1/ Delete as appropriate, to show whether this schedule relates to Substantial Completion or Final Completion..

2/ This schedule is to accompany the Substantial Completion/ Final Completion Inspection Report, together with the Formal Schedule of Outstanding Works Required, with key points highlighted and detailed above for senior management attention/action.

FINAL COMPLETION INSPECTION REPORT

MEMORANDUM

To: Contract Administration Division Manager

cc:

From: Signed:

Date:

Ref.:

Re.: Contract:

Section of the Works:

As directed, the above signed represented the Employer (ERA) at the Engineer's Final Inspection of this section of the Works at the end of the Defects Liability Period pertaining to the previous Substantial Completion and associated Taking-Over Certificate issued in accordance with the Conditions of Contract; and I hereby confirm that with our agreement the Engineer accepted the Works complete without defect or outstanding work required and duly issued the Defects Liability Certificate/issued the attached Schedule of Works required to be expeditiously completed by the Contractor before the Works would be accepted as complete.*

Outstanding works of particular significance to the inspection team are highlighted on the actual Final Schedule of Works and detailed for management attention/action on the following summary sheet.

In addition, a copy of the Schedule of Works issued with the Taking-Over Certificate was checked off as completed by the inspection team and is attached; together with the Engineer's formal response to the Contractor.

Finally, please also find herewith a separate duly completed standard inspection report regarding the contract as a whole.

* Delete as appropriate.

**OUTSTANDING WORKS OF PARTICULAR SIGNIFICANCE –
AT SUBSTANTIAL/FINAL COMPLETION /1**

Contract:

Substantial Completion Date:

Section of the Works Inspected:

Defects Liability Period:

Inspection Date:

Expiry Date of Defects Liability Period:

Page No.	Item No.	Points of Particular Interest (requiring attention/action as shown	Referred for info only	Referred for Action

1/ Delete as appropriate, to show whether this schedule relates to Substantial Completion or Final Completion.

2/ This schedule is to accompany the Substantial Completion/ Final Completion Inspection Report, together with the Formal Schedule of Outstanding Works Required, with key points highlighted and detailed above for senior management attention/action

Appendix 8-2 - Guideline CA13 Road Inventory Survey

GUIDELINE N° CA13



Ethiopian Roads Authority

Guideline N° CA13

Road Inventory Survey

Contract Administration Manual

November 2006

**FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
ETHIOPIAN ROADS AUTHORITY
CONTRACT ADMINISTRATION DIVISION**

Road Inventory Survey

November 2006

Guidelines for Road Inventory Survey

At the time of issue of the Taking-Over certificate (at the beginning of the defects liability period) the supervision consultant is required to carry out a detail road inventory survey, in accordance with the following notes.

The Condition forms are required to be included in the project's final report.

Organisation

The consultant is responsible for the task of doing the field survey, which includes familiarity with these instructions, organising the work in liaison with the DMO, accurately filling in the forms, checking same and submitting the originals to the Network Management Division through the respective ERA project engineer. Network Management will enter data into the ERA PMS.

The participation of DMO is important for locating and securing road reference points, and for DMOs familiarization with the road particulars.

As a background for the field work, the survey crew should be familiar with the ERA road data base.

The survey may be made in either direction of the road but must be correctly referenced to the PMS.

It is preferred that only one link is written into each form. In case difficulties appear in locating a node (end of link), e.g. district boundary, two or three links may be measured with running kilometrage. All link numbers must be noted on the form.

It is imperative that measurement starts and ends on a particular point of reference, which is clearly and easily identified (often a road intersection).

Accuracy

Accurate distance readings (station) along the road link are imperative, as one objective of the survey exercise is to measure the correct length of each road link. Therefore a high accuracy trip meter must be used for positioning, and it must be calibrated every day.

Distance readings are required with 10-m accuracy (km with 2 decimals).

Instructions for filling in the form:

Header rows

Road	Enter the road number
District	Enter the name of the district
Date	Enter the date of field survey
Start of Survey	Enter the exact point of reference where the measurement starts (always at the beginning of a link) i.e. the zero point
End of Survey	Enter the precise point of reference where the measurement ends (always at the end of a link)
Link(s)	Enter the link number or numbers of the survey
Page	Use when the running kilometrage requires more than one page

Columns 'distance' to 'level'

In the zero (0.00) row, write the initial value for each column, pertaining to the road at the point of starting the measurement (where a link starts). In the following rows, write the value/code when a change occurs in one (or more) of the columns. No values need to be copied down - a value is valid until a change is entered into a particular column.

The codes to be entered are shown by the bottom of the form.

Distance		A measurement always starts at zero (0.00), at the beginning of a link. In the cells down, write the station (meter reading - km with 2 decimals) when a change occurs in any of the columns, or when an object (road furniture) appears
Right Lane.	- width	Enter the width of the roadway to the nearest 0.5 m
	- surface	Enter the code for the surface type (asphalt AS, seal SE, gravel GG, earth Nat), and the layer thickness to the nearest 1 cm (e.g. AS3)
Base		Enter the code for the type of base course (crushed stone CR, stabilised layer TB, natural material NG), and the layer thickness to the nearest cm (e.g. TB15)
Shoulder left	- width	Enter the width of the left hand shoulder to the nearest 0.5 m
	- surface	Enter the code for the shoulder surface type
Shoulder right	- width	Enter the width of the right hand shoulder to the nearest 0.5 m
	- surface	Enter the code for the shoulder surface type
Terrain		Enter the code for hilliness of the terrain (plane PL, rolling UN, mountainous MO)
Road level		Enter the code for road levelling (bank AT, cut ES)

Road Furniture

In the two columns will be entered codes and the related descriptions of roadside furniture, drainage, bridges etc., as follows below. Meter reading should be made at the beginning (i), at the end (f), at the centre (c) of an object, or at a defined reference (r) point as indicated in the code explanatory column.

column	column	column
<u>code</u>		<u>description</u>
CTY	village, town, city (r)	name of place with more than 20 houses/huts; exact reference point
INT	intersection (c)	intersecting road no; access to <u>place</u> left or right; railway x-ing
BRI	bridge - initial joint(i)	length (1.0 m acc.); width (0.5 m acc.); deck material; bridge over _____ (river-name; road No; railway)
BRF	bridge - final joint (f)	
VIA	Viaduct (c)	height x width of opening (0.1 m acc.); viaduct under _____ (road No, railway, footway)
TUB	tube culvert (c)	number of tubes, (0.1 m acc.) diameter, material

Appendix 8-3 - Guideline CA14 Road Condition Survey

GUIDELINE N° CA14



Ethiopian Roads Authority

Guideline N° CA14 Road Condition Survey

Contract Administration Manual

November 2006

**FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
ETHIOPIAN ROADS AUTHORITY
CONTRACT ADMINISTRATION DIVISION**

Road Condition Survey

November 2006

Guidelines for Road Condition Survey

At the time of issue of the Taking-Over certificate (at the beginning of the defects liability period) the supervision consultant is required to carry out a detail road condition survey, in accordance with the following notes.

The Condition forms are required to be included in the project's final report.

Organisation

The consultant is responsible for the task of doing the field survey, which includes familiarity with these instructions, organising the work in liaison with the DMO, accurately filling in the forms, checking same and submitting the originals to the Network Management Division through the respective ERA project engineer. Network Management will enter data into the ERA PMS.

The participation of DMO is important for locating and securing road reference points, and for DMOs familiarization with the road particulars.

As a background for the field work, the survey crew should be familiar with the ERA road data base. The survey may be made in either direction of the road but must be correctly referenced to the PMS.

It is preferred that only one link is written into each form. In case difficulties appear in locating a node (end of link), e.g. district boundary, two or three links may be measured with running kilometrage. All link numbers must be noted on the form.

It is imperative that measurement starts and ends on a particular point of reference, which is clearly and easily identified (often a road intersection).

Accuracy

Accurate distance readings (station) along the road link are imperative, as one objective of the survey exercise is to measure the correct length of each road link. Therefore a high accuracy trip meter must be used for positioning, and it must be calibrated every day.

Distance readings are required with 10-m accuracy (km with 2 decimals).

Instructions for filling in the form:

Header rows

Road	Enter the road number
District	Enter the name of the district
Date	Enter the date of field survey
Start of Survey	Enter the exact point of reference where the measurement starts (always at the beginning of a link) i.e. the zero point
End of Survey	Enter the precise point of reference where the measurement ends (always at the end of a link)
Link(s)	Enter the link number or numbers of the survey
Page	Use when the running kilometrage requires more than one page

Columns ‘distance’ to ‘edge break’

In the zero (0.00) row, write the initial value for each column, pertaining to the road at the point of starting the measurement (where a link starts). In the following rows, write the value/code when a change occurs in one (or more) of the columns. No values need to be copied down - a value is valid until a change is entered into a particular column.

The codes to be entered are shown by the bottom of the form.

Distance	A measurement always starts at zero (0.00), at the beginning of a link. In the cells down, write the station (meter reading - km with 2 decimals) when a change occurs in any of the columns, or when an object (road furniture) appears
Aggregate Loss	Enter the code for the percentage of the total road width over which aggregate loss is occurring.
Rutting	Enter the average rut depth (mm) of both the right and left hand lanes.
Corrugation	Enter the code for the level of corrugation (mm/km). On the right bottom right hand side of the form there is written explanation of the corrugation codes to facilitate a subjective coding.
Pot Holes	Enter the code for the area of potholes occurring per kilometre (m ² /km)
Patching	Enter the code for the patched area occurring per kilometre (m ² /km)
Cracking	Enter the code for the percentage of the total road area which is cracking and the width of the cracks (mm).
Edge Break	Enter the length (m) of edge break occurring per kilometre of road per side (LHS & RHS)
Road level	Enter the code for road levelling (bank AT, cut ES)

The form is to be signed by the responsible inspector.

Appendix 8-4 - Sample Taking Over Letter

To The Engineer from ERA

Dear Sir

Contract Number:

Contract Name:

Taking-Over Certificate

In terms of Sub-Clause 2.1(g) Engineer's Duties and Authority you were required to specifically obtain our approval before issuing any Taking-Over Certificate.

Following our inspection of the Works on and on the condition that the works listed below are completed and/or rectified with due expedition during the Defects Liability Period¹ you are hereby authorised to issue the Taking-Over Certificate in terms of clause 48.1.

(List any known outstanding works and defects)

-
-
-
-
-

Yours faithfully

(Authorised ERA signatory)

¹ Rather than allow the Contractor the full Defects Liability Period for completing and rectifying the Works, one could specify a particular date by which the works are to be completed, failing which the authorisation would be rescinded.

Appendix 8-5 - Defects Report Form

Ethiopian Roads Authority

DMO Notification of Defect for Repair

DEFECTS LIABILITY PERIOD NOTIFICATION OF A DEFECT	Date:
Project Name ¹ :	Contractor's Name:
Road Number ² :	Location ³ :
Position ⁴ :	
Description ⁵ :	
Rectification ⁶ :	
Observed by ⁷ :	

- Notes:
1. As defined in the contract document. This is usually the names of the start and end points of the project.
 2. This is the national roads classification number
 3. The chainage from the contract start point to the defect
 4. Detail the physical position of the defect within the road reserve i.e. Left or Right- Drain, Embankment, Shoulder, Carriageway, Centreline etc.
 5. Enter a detailed description with a sketch (if necessary) of the defect. This description should include details of the extent, volume, area etc effected by the defect plus the date when the defect was observed and the possible cause of the defect.
 6. Enter a suggestion as to the remedial measures required to rectify the defect.
 7. Enter the name, position and contact details of the person who can be contacted in relation to this defect.

Appendix 8-6 - Contractor's Performance Report

[Enter Project Name]

CONTRACT NO. [Enter ERA contract number]

CONTRACTOR PERFORMANCE REPORT**General information**

Contractor name: _____

Contract description: _____

Original Contract period: _____ Date of commencement: _____

Original date for completion: _____ EOTs approved: _____

Actual date of completion: _____

Original Contract Price: _____ Final Contract Price: _____

Contractor's performance

	Unsatisfactory	Acceptable	Good	Superior
Time management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standard of work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality of site personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Management of subcontractors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contract administration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health and safety management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industrial relations management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workforce or skills development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Co-operative relationships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Suitability for further work Not suitable Suitable*if "not suitable", detailed reasons must be given and supporting documentation attached*The report has been forwarded to Contractor yes noRecommended for further work yes no

If the recommendation is no, the unsatisfactory performance aspects have been discussed with:

Name of Contractor's representative _____

Telephone _____ Date of discussion _____

Minutes of meeting and Contractor's response attached yes no_____
Project Manager_____
Date

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