

APPENDIX 4.21

(See Paragraph 4.157)

List of Minor Works Undertaken During the Financial Year 20...

Note: - This should be submitted to the Works Department Secretariat on the 20th July in duplicate. Works costing Rs.500 and below should be grouped together and shown in one item.

Serial No.	Name of Work	Amount of sanctioned estimate	Expenditure to end of the previous year	Net allotment sanctioned during the year
(1)	(2)	(3)	(4)	(5)
	TOTAL			

Expenditure during the year	Saving (-) or Excess (+)	Brief explanation for saving or excess	Remarks
(6)	(7)	(8)	(9)
TOTAL			

- (a) Total net amount of assignment at the disposal of the Commissioner or Head of Department during the year.
- (b) Total expenditure
- (c) Saving or excess

.....
Signature of Head of Department

APPENDIX 4.22

(See Paragraph 4.143)

Letter of Credit

OFFICE OF THECIRCLE.....MEMO
No..... DATED.....

To,
The Agent, State Bank of India,
The Treasury Officer,
.....

I do hereby authorize the Executive Engineer
..... Division to draw
cheques up to a (further) limit of Rs.....(Rupees
.....only) for the year

Taking into account the (progressive) limits of Rs fixed
under letter or credit No. dated his revised limit of
..... drawal is thus fixed at a total sum of Rs.
..... (Rs.only) up to which
amount cheques drawn by him during the year may be honoured.

The cheques drawn by him from 1-4-19shall be covered within the limit
fixed above.

Superintending Engineer

.....
.....

Endt. No.

Dated

1. Copy forwarded to the Chief Engineer, Department
..... for information.

- (i) Total amount previously authorised Rs.
 - (ii) Amount authorised under this letter number Rs.
Total Rs.
2. Copy To the Executive Engineer, for information and
necessary action with reference to his memo No.
dated
3. The details of up to date L.O.C.'s. issued is as under : -

Serial No.	Grant number and Head of account	L.O.C. previously issued (Rs. in Lakhs)	L.O.C. now issued (Rs. in Lakhs)	Total L.O.C. issued (Rs. in Lakhs)
(1)	(2)	(3)	(4)	(5)

The expenditure should be limited to the tune of L.O.C. issued as above.

Superintending Engineer

.....

.....

APPENDIX 5.01

(See Paragraph 5.026)

Form of Working Out Hourly Use Rate

1.	Name of machine and code No.	..
2.	Population	..
3.	Year of purchase	..
4.	Purchase cost	.. Rs,
5.	Present cost	.. Rs.
6.	Life in year	..
7.	Cost of Tyre tubes	.. Rs.
8.	Life of tyre tubes	..
9.	Appreciated value	.. Rs.
10.	Scrap value	.. Rs.

A. Departmental Rate :

- I. Depreciation of machine (appreciation value/purchase value minus 10% scrap value)

Life in Hours .. Rs.

.. Rs.

- II. Proforma reserve (240% of depreciation)

- III. Tyres and Tubes :

(i) Depreciation of tyres and tubes (cost/life)

(ii) Repair provision (15% of tyre and tube depreciation) .. Rs.

.. Rs.

.....

Total .. Rs.

IV. Consumables :

1. Fuel

(litre/hour at Rs. _____ /lit) Rs.

2. Lubricants

(at 40% cost of fuel) Rs.

3. Filter battery, wire rope, etc.

(at 10% of cost of fuel) Rs.

(miscellaneous Sundries at 25% of fuel) Rs.

Total cost of consumables

Rs.

V. Crew charges :-

1. Foreman

.. Rs.

2. Operators

.. Rs.

3. Mechanic

.. Rs.

4. Helper

.. Rs.

5. Watchman

.. Rs.

6. Field recording staff

.. Rs.

7. Electrician

.. Rs.

8. Fitter

.. Rs.

Add 20% Allowances for T.A, D A, C P F, G P F, etc.

Rs.

Total cost of consumables

Rs.

ABSTRACT :-

1. Depreciation

.. Rs.

2. Proforma reserve

.. Rs.

3. Tyre and Tubes

.. Rs.

4. Consumables

.. Rs.

5. Crew Charges

.. Rs.

Total.. Rs.

Add 10% overhead charges

.. Rs.

Total hourly rate, for departmental works

.. Rs.

B. Additional Charges for Commercial Use :-

- | | | |
|----|---|--------|
| 1. | Establishment charges on account of regular establishment of department at 12.5% hourly use rate. | Rs. |
| 2. | Intrest charges at 12.5% | .. Rs. |
| 3. | Tools and Tackles at 1.5% of depts. hourly rate. | Rs. |
| 4. | Audit and Account at 1% | .. Rs. |

Total cost of consumables	Rs.
---------------------------	-----

Idle Charges :-

Departmental/Commercial

- | | | |
|----|--|--------|
| 1. | Depreciation at 50% due to obsolescence. | .. Rs. |
| 2. | Crew Charges | .. Rs. |
| 3. | Interest Charges | .. Rs. |

Total	.. Rs.
-------	--------

Chief Engineer, E/M

.....

Department

- Note :- (1) The current use rates for, machinery should be prepared, adopting approved life tables and scaling of provision of repairs etc.
- (2) In order to prevent loss to the state, when machinery is loaned to the contractors and others, the original, book value of the machines remaining uncharged in the books, assumed but realistic book value for the purposes of calculation of depreciation and proforma reserve at 75% of the replacement value should be adopted.
- (3) Fuel consumption of various machines should be adopted based on actual consumption basis and provision for lubricants at actual should be made at 40% of fuel costs.
- (4) To encourage fullest utilisation and discourage idling of equipment the following idle charges should be worked out and levied for the period of short utilisation (minimum utilisation accepted minus the actual utilisation).

STIPULATED MINIMUM UTILIZATION				
	For Departmental and other Government works (1)	For contractor and Semi Government bodies (2)	For Departmental and other Government works (3)	For contractor and semi Government bodies (4)
(1) Daily	5	7	100	140
(2)	125	150	2500	3500
Monthly				
(3) Per season	1000	1000	20000	20000

- (5) No. idle charges are to be recovered for Sundays/weekly off-days and for any day declared as holiday for the E & M formation or when the machine is out of order for more than 4 hours during a shift of 8 hours duration due to repairs for defects in machine.

APPENDIX 5.02
(See paragraph 5.028)

FORM OF HANDING OVER NOTES OF MACHINES/EQUIPMENTS

1. Name of MachineScraper/Dozer /Tractor etc.
2. Make and Model.....
3. Project No /Registration No.....
4. Name of Driver /Operator.....
5. His pay at Rs.....P.M., D.A. at Rs.....
A.D.A. at Rs.....etc.
6. Name of Division /Sub-Division from which the vehicle being transferred.
.....Place.....Date.....
7. Hour/Km meter reading.....
8. Engine Make..... S. No.....
9. Chassias S. No.....Year.....
10. Fuel Pump S. No.....make.....year.....
11. Condition of the following:-
 - (a) Engine.....Working order /Under repair.
 - (b) Transmission assembly.....Working order/Under repair
 - (c) Chassis Assembly.....
 - (d) Blade assembly /Scraper body/Accessory drive.....
12. Instrument panel:-
 - (a) Hour /Kilometer assembly.....
 - (b) Oil pressure gauge.....
 - (c) Oil temperature gauge.....
 - (d) Water temperature gauge.....
 - (e) Air pressure gauge.....
 - (f) Ampere meter.....
 - (g) Transmission gauge (i) Oil pressure.....(ii) Temperature.....
 - (h) Tachometer /ROM gauge.....
13. Condition of Electric fittings:-
 - (a) Battery make.....S. No. (i).....Volts.....(ii)
(iii).....(iv).....
 - (b) Front light (Right).....(left).....
 - (c) Instrument panel.....
 - (d) Back light.....
 - (e) Wiper blade assembly.....
 - (f) Emergency drop Switch.....
 - (g) On/Off light Switch.....
14. Condition of Radiator:-
15. Tyres /Chain assembly Make.....Size.....
(Right).....(Left).....
16. Whether the following items fitted or not?
 - (a) Seat Setting.....Back rest.....Side.....
 - (b) Horn Electric/Air.....
 - (c) Cut out Assembly.....
 - (d) Radiator Cap.....
 - (e) Diesel tank cap and jalli.....
 - (f) Front glass.....Rear cabin glass.....

- (Wind screen glass)
(g) Door glass.....
17. Tools supplied with Machine (List Attached).....
 18. Fuel /Lubricants issued with machine – (a) HSD.....
(b) Mobile Oil.....(c) Break Oil.....
 19. Self starter assembly.....
 20. Dynamo assembly.....
 21. Hydraulic tank cap and assembly.....
 22. P.T.O. **Sharft** and Cross Assembly.....
 23. Log books.....
 24. Registration Card/Fitness certificate.....
 25. Remarks.....

Handed Over By

Dated Signature of Sub-Engineer

E/M Section .

Taken Over By:-

Dated Signature of Sub-Engineer
E/M.

Counter Signed By:-

Dated Signature of S.D.O. E/M.

APPENDIX 5.03

(See paragraph 5.031)

LOG BOOK FOR EARTH MOVING MACHINES**INSTRUCTIONS**

1. The Executive Engineer, E & M. shall have all blank log books required for his region under lock and key and maintain a register of receipt and issue as required to be maintained in the Division Office for Measurement Books.
2. Similarly the S. D. O. will keep a record in his office of the issue to the subordinates and operators concerned who handle and keep custody of the books and the machines.
3. Every month on the 5th at the latest, the log book in use should be returned to S. D. O. E. & M.'s Office who should arrange to complete all the subsidiary records to be filled up from the basic data available in the log books.
4. The log books shall be ready for being returned to the machine on the last day of the month so that chronological recording of events in succeeding month could be attended to without any break.
5. Log books should not be removed from machines without explicit permission and knowledge of S.D.O. E. & M. in-charge of the machine.
6. Any inspecting officer of the rank of Executive Engineer or above of the Civil or Mechanical formation is authorised to review the logbook and record his remarks.
7. All completed log books shall be returned to the Division Office and kept under safe custody for reference. Subsequent issues of these books for any purpose shall be done in the same manner as for Measurement Books deposited in the Division Office are dealt with.
8. The service record of the crew shall generally be filled by the Engineering subordinate who is in-charge of the machine at any particular time.
9. The initial record of tools and accessories shall be entered in the first log book in the Divisional Office as per purchase order, in the subsequent log book the list of tools as existing will be mentioned. In the remarks column reference to shortage due to breakage, loss and sanction to write off with number and date shall be mentioned and duly signed by the S.D. O. E. & M. to whom charge of the machine is transferred. At every change the checking officer and the receiving officer will sign the book in token of having verified the items. In the case of change of operator in every shift a general check up by the two operators at the time of changing of shifts should be made and only when there is any discrepancy in the items and list should the entry in the register be made of such discrepancies and brought to the notice of immediate officer and not otherwise.
10. The operator in-charge of the machine at any shift is responsible to fill all columns in the record of operation from 1 to 17 and shall affix his signature in column 17 in token of his having filled the log book. He shall also be responsible to get the signature of the accepting officer deputed for this work.
11. The recording of field repairs shall be done in the log book by the machine in-charge of the field repairs and attested by him. The operator will sign the book in token of having got the machine attended to and taking it back to works after field repair and trial.
12. The record of new type changes shall be filled in by the stores in-charge and signed by the operator and the mechanical subordinate. Same procedure will be adopted in the matter of new wire rope and battery.

APPENDIX 5.03**GENERAL INFORMATION****Log Book**

Equipment.....Capacity.....

Departmental code and S. No

Date of first entry to the Log Book.....

Date of completion.....

Previous Log Book No.....

Subsequent Log Book No.....

Note:- Two separate Log Books should be maintained for each item of equipment, One for use in the months of January, March, May, July, September and November and the other for use in the months of February, April, June, August, October and December.

DATA SHEET

Equipment:.....Capacity.....
 Model:.....Type:.....

Name and addresses of manufacturers of mainequipment and auxiliaries.

Name and address of dealer.....

Main engineMake.....ModelS.No.....

Auxiliary engine..... Make.....Model.....S.No.....

Tyres :-

[Front Intermediate Rear

[Size and ply rating number]

Wire Rope—

Type.....Length.....

Battery:--

No.....Vol.....Plate.....

Ampere-Hour Capacity.....

Recommended Tyre Pressure –

Recommended Air Pressure—

Recommended Lub. Oil Pressure—

Capacities :-

Radiator.....

Fuel Tank.....

Engine Sump.....

Transmission.....

Fluid Drive.....

Hyd. Oil Tank.....

Equipment Length.....Width.....Height.....

Gross weigh.....Axle loads—(a) Empty

(b) Loaded.....

Note: - Items mentioned here would need modifications to suit the type of equipment.
 Their purpose is to provide a ready reference to the operating personnel.

APPENDIX 5.03
RECORD OF TRANSFER

Name of Division/ Sub- Division	Date of arrival in Division/ Sub-Division	Signature of E.E./S.D.O.	Date of departure from Division/Sub- division	Signature of E.E.S.D.O.
(1)	(2)	(3)	(4)	(5)

APPENDIX 5.03**SERVICE RECORD OF CREW**

Full Name	Designation	Permanent address	Date of appointment in the project	Date of employment on the equipment	Date of transfer/ resignation /Discharge	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)

APPENDIX 5.03**RECORD OF TOOLS, ACCESSORIES AND SPARES RECEIVED WITH THE
EQUIPMENT**

Description	Quantity	Checked and received by	Remarks
(1)	(2)	(3)	(4)

Note :- Name and designation should be entered below the signature. This should be done by an official not below the rank of a Sub-Engineer E & M.

APPENDIX 5.03**RECORD OF INSPECTION**

Date	Name and designation of inspecting officer	Observation of inspection officer	Date on which observations are attended	Remarks
(1)	(2)	(3)	(4)	(5)

APPENDIX 5.03**RECORD OF BATTERIES**

Make and identification No.of battery	Date of fitting	No. of work hours	Signature of store-in Charge	Signature of Operator	Remarks
(1)	(2)	(3)	(4)	(5)	(6)

Note :- All batteries issued by stores should be numbered.

APPENDIX 5.03**RECORD OF WIRE ROPES**

Date of change	Hour meter reading/ No. of work hours	Specifications of wire rope	Length	Location of equipment	Signature of Store Keeper	Signature of Operator	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

* Specify if replacement made due to normal wear or some damage, if due to damage, specify nature of it.

APPENDIX 5.03**RECORD OF TYRE TUBES AND CONVEYOR BELTS**

Date of replacement or repairs	Cumulative clock hours worked	Hour meter reading	LOCATION					
			Front		Inter		Rear	
			Left	Right	Left	Right	Left	Right
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Makers, names & S.Nos.		Total No. of hours worked up to renewal	Serial Nos. of replaced tyres/ tubes	Signature of store-keeper/ Operator	Signature of Checking Officer	Remarks
Tyres	Tubes					
(10)	(11)	(12)	(13)	(14)	(15)	(16)

APPENDIX 5.03**RECORD OF FILED REPAIRS**

Month 19

Date	Cumulative clock Hrs worked	Hours meter Reading	Brief description of repairs	Time of taken for repairs Hrs.	Parts Replaced	
					Description and paras No.	Quantity
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Store used		Name of mechanic	Signature of operator	Signature of checking officer	Remarks
Description	Quantity				
(8)	(9)	(10)	(11)	(12)	(13)

APPENDIX 5.04

(See paragraph 5.031)

Form of Log Book for Transport Vehicles**Instructions**

1. This book will be carried on all vehicles in a locked receptacle exclusively provided for the purpose. It should not be removed from the vehicle without the explicit permission and knowledge of the S.D.O. in-charge.
2. The E.E. shall keep all blank log books required for his region under lock, and key and maintain a register of receipts and issues as required to be maintained in the Division Office for Measurement Books.
3. Similarly the S.D.O. will keep a record of the issue of log books to the subordinates in day-to-day charge of the vehicle and also the driver running the particular vehicle.
4. Every month, on the 5th at the latest the log book in use should be returned by the subordinate to the concerned S.D.O. who should arrange to complete all the subsidiary records from the basic data available in the log books.
5. The log books shall be ready for being returned to the vehicles on the last day of the month so that chronological events of the succeeding month can be recorded without any break.
6. Any inspecting officer of the rank of Executive Engineer or above of the Civil or Mechanical formations is authorised to review the log book and record his remarks.
7. All completed log books shall be returned to the Division Office and kept under safe custody for reference. Subsequent issues of these books for any purpose shall be done as in the case of M. Bs. deposited in the Division Office.
8. The service record of the driver and cleaner shall generally be filled in by the Engineering subordinate in charge of the vehicle at any particular time.
9. The particulars of the data sheet of the first log book of the vehicle shall be recorded and signed by an officer not below the rank of S.D.O. who received the vehicle either from the suppliers or on transfer from any other formation. This will be countersigned by the Executive Engineer of the concerned Division before the vehicle is issued to works.
10. The initial record of tools and accessories shall be entered in the first log book as per purchase order. In subsequent log books the list of tools as existing will be mentioned. In the remarks column reference to shortage due to breakage, loss and sanction to write off with the number and date shall be mentioned and duly signed by the concerned S.D.O. At every change the handing over officer and the receiving officer will sign the book in token of having verified the items.
11. The records of new tyre changes shall be filled in by the Stores-in-charge and signed by the driver of the vehicle and Sub-Engineer and the concerned Sub-Divisional Officer. Same procedure will be adopted for the battery.
12. The day-to-day record of operation will be filled in by the driver/Sub-Engineer in-charge of the vehicle. The driver shall be responsible for obtaining signature of the officer concerned in token of the journeys made and materials carried and recorded in the book before he hands over charge of the vehicle or returns it to the garage.
13. The recording of field repairs shall be done in the log book by a person not below the rank of Assistant Mechanic in-charge of repairs. The driver will also sign, in token of having taken back the vehicle duly repaired.

APPENDIX 5.04**General Information****Log Book****No.....**

Brief Description of the vehicle.....

Capacity.....

Registration No.....

Departmental code and S. No.....

Date of first entry in the log book.....

Date of last entry in the log book.....

Previous log book No.....

Subsequent log book No.....

Note :- Two separate log books should be maintained for each vehicle. One for use in the months of January, March, May, September and November and the other for use in the months of February, April, June, August, October and December.

APPENDIX 5.04**RECORD OF TOOLS**

Serial No.	Description	Quantity	Checked and received by	Remarks
(1)	(2)	(3)	(4)	(5)

APPENDIX 5.04**Data Sheet**

1. Brief Description of the vehicle.....
2. Make & type of vehicle....., year of manufacture
.....Type of body.....
3. Engine make....., Engine S. No.....
No. of cylinder....., Bore of engine.....
Stroke of engine....., Horse power.....
Ignition system....., Distributor type.....
Dynamo or Generator type.....
4. Starter type....., Voltage.....
5. Battery :-
No..... Volts....., Plates.....
Ampere hour capacity.....
6. Petrol or Diesel capacity :-
Mainlitres. Reservelitres
7. Tyres....., Location.....Size.....
Pressure :-
Front.....Rear.....
8. Lubricating Oil Specification Capacity
Engine
Gear box
Chassis
Brake fluid
Shock absorber fluid
9. Axle load Empty Loaded
Front
Rear

.....
Countersignature of the Executive Engineer.....
Signature of the Sub-Divisional Officer.

Dated

Dated

APPENDIX 5.04 Chapter No.V**RECORD OF DEPARTMENTAL CHANGES AND TRANSFERS**

Formation from which change effected	Formation to which change effected	Date of transfer	Signature of S.D.O. handing over charge	Signature of S.D.O. taking over charge
(1)	(2)	(3)	(4)	(5)

Appendix 5.04**Service Record of Crew Drivers and Cleaners**

Name of driver/cleaner	Permanent address	Date of employment on the vehicle	Date of transfer/resignat ion/ discharge	Remarks
(1)	(2)	(3)	(4)	(5)

APPENDIX 5.04

RECORDS OF REPAIRS

Date of bringing the vehicle in shop	Date of taking out the vehicle from the shop	Brief description of repairs executed	Workshop job	Kilometer reading	Spare parts issued	
					Part No.	Quantity
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Cost of repairs including cost of spare parts used.	Signature of driver	Signature of foreman of shop	Countersignature of S.D.O. in-charge of shop	Remarks
(8)	(9)	(10)	(11)	(12)

APPENDIX 5.04

DAILY RECORD OF OPERATION

Date	From (time)	To (time)	Total time	Final Kilometer reading	Initial Kilometer reading	Total Kilometer run	Signature of Driver	Name of work on which <i>employed and estimate No. etc.</i>	Requisition No. and Date	Description of materials and other items moved in the vehicle	Quantity/Unit
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)

Signature of Sub-Engineer in-charge	Fuel	Record of consumable & Repairs					Signature of Driver.	Signature of store keeper issuing the fuel, lubricant, oil, etc.	Remarks
		Amount	Lubrication Oil	Amount	Other consumable	Amount			
(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
		Rs.P.		Rs.P.		Rs.P.			

APPENDIX 5.04**RECORD OF TYRE CHANGE**

Date of issue	Make and type	Kilometer run	Date of replacement	Signature of driver	Signature of issuing authority	Counter signature of S.D.O. in- charge of stores from which issued	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

APPENDIX 5.04**RECORD OF BATTERY CHANGE**

Make and identificati on No.of battery	Date of fitting	Kilometer worked	Signature of Store- in-charge	Signature of driver	Counter signature of S.D.O.	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)

APPENDIX 5.05
(See paragraph 5.031)

Form of Log Book for Inspection Vehicles

INSTRUCTIONS

1. The E.E. shall keep all blank log books required for his region under lock and key. He will maintain a register of receipts and issues as required to be maintained in the Division Office for Measurement Books. Every log book should bear a machine numbered serial number.
2. Similarly the A.E. will keep a record of the issue to the subordinates in charge of the vehicles /driver running the particular vehicle.
3. This book will be carried on the vehicle in a locked receptacle exclusively provided for the purpose. It should not be removed from the vehicle without the explicit permission and knowledge of the officer-in-charge.
4. Every month on the 5th at the latest, the log book in use should be returned to the concerned S.D.O.E & M Office who should arrange to complete all the subsidiary records from the basic data available in the log books.
5. The log books shall be ready for being returned to the vehicles on the last day of the month so that chronological events of the succeeding month can be recorded without any break.
6. Any inspecting officer of the rank of Executive Engineer (E&M) or above is authorised to review the log book and record his remarks.
7. All completed log books shall be returned to the Divisional Office and kept under safe custody for reference. Subsequent issues of those books for any purpose shall be done as in the case of M Bs deposited in the Division Office.
8. The service record for the driver and cleaner shall generally be filled in by the Engineering subordinate in charge of the vehicle at any particular time.
9. The particulars of the data sheet of the first log book of the vehicle shall be recorded and signed by an officer not below the rank of S.D.O. E/M who received the vehicle either from the suppliers or on transfer from any other formation. This will be countersigned by the Executive Engineer E/M of the concerned division before the vehicle is issued to works.
10. The initial record of tools and accessories shall be entered in to first log book as per purchase order. In subsequent log books the list of tools as existing will be mentioned. In the remarks column reference to shortage due to breakage, loss and sanction to write off with the number and date shall be mentioned and duly signed by the concerned S.D.O. At every change the handing over officer and the receiving officer will sign the book in token of having verified the items.
11. The records of new tyre changes shall be filled in by the stores-in-charge and signed by the driver and Sub- Engineer of the vehicle. Same procedure will be adopted for the battery.
12. The day-to-day record of operation will be filled in by the driver/sub-engineer of the vehicle. The driver shall be responsible for obtaining signature from the officer concerned in token the journeys made and materials carried and recorded in the book before he hands over charge of the vehicle or returns it to the garage.
13. The recording of field repairs shall be done in the log book by a person not below the rank of Assistant Mechanic-in-charge of repairs. The driver will also sign in token of having taken back the vehicles duly repaired.

APPENDIX 5.05**General Information****Log Book**

No.....

Brief Description of the vehicle.....

Capacity.....

Registration No.....

Departmental code and S. No.....

Date of first entry in the log book.....

Date of last entry in the log book.....

Previous log book No.....

Subsequent log book No.....

Note :- Two separate log books should be maintained for each vehicle. One for use in the months of January, March, May, September and November and the other for use in the months of February, April, June, August, October and December.

APPENDIX 5.05**Data Sheet**

1. Brief Description of the vehicle.....
2. Make & type of vehicle....., year of manufacture
.....Type of body.....
3. Engine make....., Engine S. No.....
No. of cylinder....., Bore of engine.....
Stroke of engine....., Horse power.....
Ignition system....., Distributor type.....
Dynamo or Generator type.....
4. Starter type....., Voltage.....
5. Battery :-
No..... Volts....., Plates.....
Ampere hour capacity.....
6. Petrol or Diesel capacity :-
Mainlitres. Reservelitres
7. Tyres....., Location.....Size.....
Pressure :-
Front.....Rear.....
8. Lubricating Oil Specification Capacity
Engine
Gear box
Chassis
Brake fluid
Shock absorber fluid
9. Axle load Empty Loaded
Front
Rear

.....
Countersignature of the Executive Engineer.....
Signature of the Sub-Divisional Officer.

Dated

Dated

APPENDIX 5.05**RECORD OF DEPARTMENTAL CHANGES AND TRANSFER**

Formation from which change effected	Formation to which change effected	Date of transfer	Signature of S.D.O. handing over charge	Signature of S.D.O. taking over charge
(1)	(2)	(3)	(4)	(5)

APPENDIX 5.05**RECORD OF TOOLS**

Serial No.	Description	Quantity	Checked and received by	Remarks
(1)	(2)	(3)	(4)	(5)

APPENDIX 5.05**RECORD OF TYRE CHANGE**

Date of issue	Make and type	Kilometer run	Date of replacement	Signature of driver	Signature of issuing authority	Counter signature of S.D.O. incharge of stores from which tyres are issued	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

APPENDIX 5.05**RECORD OF BATTERY CHANGES**

Make & identificati on No.of battery	Date of fitting	Kilometer	Signature of store- in-charge	Signature of driver	Signature of S.D.O.	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)

APPENDIX 5.05**Service Record of Crew Drivers and Cleaners**

Name of Driver/Cleaner	Permanent address	Date of Employment on the vehicle	Date of transfer/ resignation/ discharge	Remarks
(1)	(2)	(3)	(4)	(5)

APPENDIX 5.05**RECORD OF REPAIRS**

Date of bringing the vehicle in shop	Date of taking out the vehicle out of shop	Brief Description	Workshop Job No.	Kilometer reading	Spare parts issued	
					Part No.	Quantity
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Cost of repairs including cost of spare parts used	Signature of driver	Signature of Mechanic/ foreman of shop	Counter signature of Sub-Engineer/ SDO in- charge of shop	Remarks
(8)	(9)	(10)	(11)	(12)

APPENDIX 5.05**DAILY RECORD OF OPERATION**

Date	Time		Kilometer reading		Total Km. run	Place of journey	Purpose of journey
	From	To	Initial	Final			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

Record of consumables				Signature of store keeper/ Sub- Engineer issuing stores	Signature of driver	Signature of the officer using the vehicle	Remarks
Petrol/ Diesel	Engine Oil	Gear Oil	Other Stores				
(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)

APPENDIX 5.05**ABSTRACT****(To be prepared at the end of each month)****Section – A (Operation)**

1. Petrol/Diesel consumed during the month.....litres

(Initial Balance + Issues during the month – Balance in the tank).

1. A – Cost of Item No.1 Rs.....

2. Total Kms. Run during the month.....Km.

(Km. reading at the end of the month – Km. reading at the beginning of the month).

3. Average Fuel (Petrol/Diesel)consumption.....Km/litre.

4. Lubricants issued during the month, with cost

(i) Engine Oil.....litres Rs.....

(ii) Gear Oil.....litres Rs.....

(iii) Hydraulic Oil.....litres Rs.....

(iv) GreaseKg Rs.....

Total Rs.

Section – B (Repairs and Maintenance)

(i) Expenditure on spares during the month Rs.....

(ii) Expenditure on labour charges during the month Rs.....

(iii) Expenditure on miscellaneous items during the month Rs.....

Total expenditure on Repairs & Maintenance Rs.

Section – C-

Expenditure on crew during the month Rs.

Per KM rate of the vehicle = Total Expenditure (POL+ Repairs-Crew)

Total KM run during the period

= Rs.....

It is certified that all necessary entries have been made in the log book.

Dated Signature of Sub-Engineer E/M

Dated Signature of S.

D.O E/M

APPENDIX 5.06
(See paragraph 5.043)

Form of Estimates for Major/Special Repairs

Office of E/M

MAJOR/SPECIAL REPAIRS ESTIMATE NO.....

(1) Name of Machines with full description :

(2) Registration No.: Engine No.: Chasis No.:

(3) Date of purchase : Purchase value:

Estimate prepared by Checked by Recommended by

Date Signature and
Designation of the officer.
officer.

Date Signature and
Designation of the officer.

Date Signature and
Designation of the

Sanctioned for Rs.....(In words)Rs.....

Head of account to which Chargeable-

Signature of Sanctioning Authority.

APPENDIX 5.06

GENERAL REPORT

1. Date from which the machine is under the control of present officer.
2. Necessity for the repairs proposed.
3. Hours/Km. the machine is expected to give after repairs.

4. Total Kms./Hrs. covered by the machine since purchase.
5. From which date the machine is lying idle.
6. Date of last repair with its cost.
7. Nature of last repairs with brief description.
8. When was the major repairs and overhauling carried out to the machine last time and at what cost?
9. Brief description of last major repairs.
10. Date of commissioning of machine after last major repairs.
11. Hours/Kms. run after last major repairs including later minor repairs.
12. Total up to date expenditure on all kinds of repairs and replacements since the date of purchase of the machine.
13. What is the maximum limit for repairs of the machine during its whole life as per laid down norms?
14. Whether the amount of repairs now proposed including the expenditure already incurred on repairs to date is within the maximum limit prescribed for its whole life period ? (give a clear account).
15. Name and designation of E/M officer who physically inspected and examined the machine and suggested the repairs with date of his inspection (copy of inspection report to be attached).
16. Head of account to which the expenditure is debitable.

APPENDIX 5.06**SECTION A - PROCUREMENT OF NEW PARTS**

Serial No.	Description	Quantity	Rate	Amount Rs. P.
(1)	(2)	(3)	(4)	(5)

SECTION B – REPAIRS OF OLD PARTS

Serial No.	Description	Quantity	Rate	Amount Rs. P.
(1)	(2)	(3)	(4)	(5)

SECTION C – LABOUR CHARGES

Serial No.	Description	Quantity	Rate	Amount Rs. P.
(1)	(2)	(3)	(4)	(5)

SECTION D – MISCELLANEOUS AND UNFORESEEN CHARGES

Serial No.	Description	Quantity	Rate	Amount Rs. P.
(1)	(2)	(3)	(5)	(6)

APPENDIX 5.06**Completion Report Certificate**

Amount of sanctioned estimate

Rs .

Expenditure actually incurred

Rs.

Difference

±

Reasons for excess/savings, if any :

CERTIFICATE

1. Certified that I have personally inspected the machine and satisfied myself that the repair work has been carried out in all respects as per the sanctioned estimate and that the machine is in good condition for doing further work to the extent mentioned against item3 of the general report.
2. Certified that the repairs work have been duly entered in the log book of the machine.

.....

Signature of
Sub-Divisional Officer E/M in-
charge.

Remarks and observation of E.E. E/M after his physical verification and inspection of the machine after completion of repairs. –

.....

Signature of
E.E. E/M in-charge.

APPENDIX 5.07

(See Paragraph 5.046)

FINANCIAL POWERS TO EXERCISED BY OFFICERS OF WORKS**DEPARTMENT IN RESPECT OF E&M WORKS**

Item No.	Particulars of	POWERS OF (in Rs.)				Autho rity	Remarks
		C.E.	S.E.	E.E.	S.D.O.		
1	2	3	4	5	6	7	8
1.	To sanction estimate for maintenance, up keep and repairs to Govt. vehicles. (Excluding cost of periodical changes of tyres, tubes and battery). For vehicle below 18 HP.	20,000 P.a.	20,000 P.a.	20,000 P.a.	20,000 P.a.	W.D. manu al clause 5.046	1. Subject to Budget provision and observance of Govt. instructions. 2. Under unavoidable circumstance if expenditure exceeds the limit, sanction of the next higher authority should be obtained to the extent of budget provision.
2.	To sanction estimate for repair to Govt. vehicles. (Excluding cost of periodical changes of tyres, tubes and battery). For vehicle 18 HP and above	30,000 P.a.	30,000 P.a.	30,000 P.a.	30,000 P.a.	W.D. manu al clause 5.046	1. Subject to Budget Provision and observance of Govt. instructions. 2. Under unavoidable circumstance if expenditure exceeds the limit, sanction of the next higher authority should be obtained to the extent of budget provision.
3.	Purchase of tyre-tubes and batteries	Full powers	Full powers	Full powers	-	W.D. manu al clause 5.046	Subject to the condition that in case of Tyres and Tubes the specified Kilometrage and in case of battery, the specified period is completed. In case due to unavoidable circumstances expenditure tyre/tubes and battery is to be incurred before completion of the specified period the next higher authority shall be competent to sanction within budget provision. No department shall buy nylon or radial tyres or radios, stereos, tape recorders, air conditioners of vehicles.

4.	To accord technical sanction to the estimate for purchase of special plants and machinery including heavy earth moving machinery.	Full powers	40.00 Lakh	-	-	-	As per prescribed scale.
5.	To accord technical sanction to the estimate for repairs to plants and machinery other than heavy earth moving machinery	Full powers	Full powers	2.00 Lacs (E/M) Rs. 25,000 (civil) *	-	-	Based on detail sanction estimate. *for each plant and on urgency only.
6.	To accord technical sanction to the estimate for repairs to special plants and machinery including heavy earth moving machinery and drilling rigs.	Full powers	Full Power (E/M)	5.00 Lacs (E/M) Rs. 5,000 (Civil) *	-	-	Based on detail sanction estimate. *for each plant and on urgency only.
7.	To accord technical sanction to the estimate for repair to special plants and machinery including earth moving machinery in case proforma reserve is not available.	Full powers	Full Power (E/M)	-	-	-	-
8.	To sanction the sale of spare parts of machinery to Local bodies, Private persons, Corporations, when it can be done without inconvenience to Government Works.	Full powers	-	-	-	-	-
9.	To purchase spare parts for a particular machines against the sanctioned repair estimate on limited tender.	Rs. 1.00 Lacs	Rs. 75,000	Rs. 25,000	-	-	The purchases shall be recommended by the "P.C." constituted at Division level/Circle level/ Zone level / E-in-C level.
10.	To purchase spare parts for a particular machine against the sanctioned repair estimate on Open tender	Rs. 50.00 Lacs	Rs. 25.00 Lakhs	Rs. 5.00 Lakh	-	-	The purchase shall be recommended by the "P.C." constituted at Division level/Circle level/ Zone level.
11.	To fix and revise schedule of rate for E&M works	-	-	-	-	-	E-in-C will have full power.
12.	To carry out repair of assembly/specific parts of machinery through original manufacturer or their authorised agents on single tender.	Full power	Rs. 5.00 Lakh	Rs. 50,000	-	-	-
13.	Purchase of plant and Special machinery, equipment, spares and miscellaneous items urgently required on single or limited tender excluding vehicles from recognised manufacturer or his local	Rs. 3.00 Lacs	Rs. 1.00 Lacs	25,000 (limited to Rs.10,000 in a month)	-	-	S.E. and E.E. should forthwith report to higher authority explaining the nature of urgency. The powers are exercisable subject to the condition that the parts so purchased, are

	agent or his authorised dealers.						immediately used on works.
14.	To take Plant/Machinery on hire from any agency.	Full powers	-	-	-	5.047	-
15.	To give plant/machinery on hire to contractors, other Government Department, Semi Government Organization / Local bodies.	-	-	Full Power	-	-	1. In case of WR Deptt. 2. In case of PWD and PHED subject to the condition of exceeding agreement and singing bond. 3. All cost of repairs shall be bourn by the hirer. Staff shall be of the department, whose salary has to be bourn by the hirer.
16.	To purchase P.O.L. for heavy plant and special machinery (excluding vehicles) urgently required on single or limited tender from recognized or authorized dealers.	-	Up to 3.00 Lacs	Up to 1.00 Lacs	-	-	

APPENDIX 5.08

(See paragraph 5.047)

Form of Agreement for hiring of Government Plant and Machinery to contractors/ Piece workers/ Private Bodies, etc.

An agreement made this.....day of 20.....between the Governor of C.G. acting through the Executive Engineer.....(hereinafter called the Governor which expression shall where the context so admits include his successor in office) on the one part ; and Shri.....son of.....resident ofthe.....tahsil of district(hereinafter called the hirer which expression shall, were the context so admits include his heirs, executors, administrators, representatives and assigns) on the other part.

Where as the hirer has applied to the State Government the hire of the machinery described in the schedule appended herewith for a period of.....months fromto.....

Now it is agreed between the parties hereto that

- (i) The Executive Engineershall provide and set and operate to the hirer the said machinery for a period offromtoat the desired place in the.....tehsil of.....district. The machinery shall be deemed to remain always under the overall and direct control S.D.O. E/M.....for the purpose of arrangement and supply of P.O.L., field operations and maintenance etc. The hirer shall not be allowed at any time to operate, maintain, run or work the machines with his materials directly.
- (ii) (a) The hirer shall deposit in advance a sum of Rs..... with the Executive Engineer as security for the due performance and observance of the conditions and terms of this agreement.
- (b) The hirer shall further deposit in advance a sum of Rs.....with the Executive Engineer being approximate amount of hire charges of the said machinery for the period of hire as specified in clause (iii) below. The hirer shall pay the balance amount of hire charges, if any, for the said machinery immediately on the expiry of the period of hire. If the hirer fails to pay the hire charges it will be recovered from any other payment which may be due to hirer or failing which as arrears of land revenue. The excess amount in deposit, if any, with the department shall be returned to him on expiry of the period of hire.
- (iii) The hire charges inclusive of departmental charges and interest charges for the said machinery recoverable from the hirer as worked out on the basis of the rates shown in the attached schedules shall be final and payable by the hirer to the department. No remission of hire charges shall be permissible.
- (iv) The hirer shall during the period the machines are employed by the department and working on his works be responsible to make good to the department any loss or damage caused to the said machinery and men working on the machine due to circumstance caused on account of any of hirer's lapse like preventing the officers to attend to regular maintenance and timely repairs and his failures in respect of non maintenance of haul roads, both in respect of grade and proper watering, lighting or any other cause as may be provided in the agreement. The Executive

Engineer in charge shall be the final authority to determine the extent of damage and amount recoverable which may be deducted from the security deposit.

- (v) Any sums due from the hirer under this agreement shall be recoverable as arrears of land revenue.
- (vi) (a) Basic hourly rate for purposes of determining ultimate charges to be recovered from the hirer for the issue of the said machinery shall be as given in the schedule attached to this agreement. On the amount, so worked out for any period, department charges at the rate of.....% will be added in addition. The hirer shall also pay interest charges on capital on the following basis for each day of this agreement period and for the extra period of the duration of the contract if extended on the basis as under:-
 - 1.per day.
 - 2.per day.
 - 3.per day.
- (b) No rebate on account of idle hours of machine will be given excepting when the machines break down and cannot actually do any work. Even under such circumstances, specific orders in writing by the S.E. (E/M) or S.E. (Civil) of the Circle for rebate due, if any, shall have to be obtained.
- (vii) (a) The total hours that will be reckoned for the purposes of charging the hirer on hourly basis under (iii) and (vi) above shall be according to clock hours and these shall be reckoned from the actual time the said machinery leaves the workshop and returns to it after use on hirer's work (including the time required for adjustments in the machinery but excluding period involved in the machinery on break downs and stoppage of work due to any reason under orders of Executive Engineer).
- (b) The said machinery shall work daily in shifts as prescribed by the Executive Engineer-in-charge and the S.D.O. E/M according to suitability from time to time and intimated to the hirer. The actual time of operation of machinery by the department on hirer's work on each day shall be entered in the log book of respective machinery by the S.D.O. E/M or his sectional officer on each such occasion of the day and these entries in the log books shall be signed by the S.D.O. E/M or his sectional officer and the hirer.
- (viii) The hirer shall report to the Executive Engineer-in-Charge or the S.D.O. E/M any defect in the working of said machinery during working hours and the Executive Engineer-in-Charge or the S.D.O. E/M shall get the defect removed on the field itself or at the departmental workshop.
- (ix) The executive Engineer may at any time by giving seven days notice in writing to the hirer terminate this agreement. The hirer shall not claim any compensation for such action.
- (x) In case of non observance and or non performance by the hirer of the any of the provisions herein before contained the Executive Engineer shall be at liberty forthwith to terminate this agreement without prejudice to the right of the Government to recover damages from the hirer for the breach of any clause of this agreement as arrears of land revenue.

- (xi) On termination of agreement the amount of security deposit shall be refunded to the hirer after deducting from it, any sum that may be found due from the hirer in accordance with the terms of the agreement.
- (xii) In the event of any dispute between the parties here to as regards interpretation or any other cause due to any of the conditions of this agreement the decision of the Superintending Engineer (E/M) or Superintending Engineer (Civil) of the Circle as the case may be shall be final, conclusive and binding on both.

Witness-

1.....

2.....

1.....

2.....

.....
Signature of the hirer.

.....
Signature of Executive Engineer

APPENDIX 6.01

(See Paragraph 6.011)

Statement showing details of field/laboratory tests, and reference

S.No.	Test	Reference to Indian Standard
(1)	(2)	(3)
1.	Water 1. pH value 2. Hardness	IS:5741 do.
2.	Metal 1. Sieve analysis 2. Unit weight 3. Water absorption 4. Specific gravity 5. Impact value 6. Abrasion value 7. Crushing value 8. Soundness 9. Surface moisture contents	IS:2386 (Part I) IS:2386 (Part III) do. do. IS:2386 (Part IV) do. do. do. do. IS:2386 (Part III)
3.	Sand 1. Fineness modulus 2. Unit weight 3. Silt and clay 4. Bulking 5. Moisture content 6. Specific gravity	IS:2386 (Part I) IS:2386 (Part III) IS:2386 (Part II) IS:2386 (Part III) do. (Part II) do. (Part III)
4.	Cement 1. Specific gravity 2. Consistency 3. Initial and final setting time 4. Soundness 5. Compressive strength 6. Adulteration of Cement	IS:4031 do. do. do. do.

S.No.	Test	Reference to Indian Standard
(1)	(2)	(3)
5.	Lime 1. Workability 2. Soundness 3. Setting time 4. Compressive strength	IS:6932 (Part VIII) IS:6932 (Part IX) IS:6932 (Part VIII) IS:6932 (Part VII)
6.	Steel	As prescribed by the Engineer in-charge of the Project.
7.	Pozzolana (Surkhi) 1. Fineness modulus 2. Specific gravity 3. Compressive strength 4. Lime reactivity	IS:1727 do. do. do.
8.	Mortar/Concrete 1. Slump 2. Compressive strength 3. Permeability	IS:1199 S:516 IS:3085
9.	Mix design of mortar / Concrete	IS:456
10.	Percolation test for masonry dams	As prescribed by Engineer in-charge of the project .
11.	(a) Soils 1. Standard compaction test 2. Atterberg's limits 3. Grain size analysis 4. Shear strength 5. Permeability tests	IS:2720 (Part VII) IS:2720 (Part V) IS:2720 (Part IV) IS:2720 (Part XI) IS:2720 (Part XII) IS:2720 (Part XVII)

S.No.	Test	Reference to Indian Standard
(1)	(2)	(3)
	(b) Field tests for rolled fill/bed rock 1. Field moisture and density for field compaction 2. Field permeability 3. Shear tests Note:- Test Procedures shall conform to Indian Standards.	IS:2720 (Part XXVIII) And IS:2720 (Part XXIX) IS:5529 (Part I) (for rolled fill) IS:5529 (Part II) (for bed rock) IS:2720 (Part XI) IS:2720 (Part XII)

APPENDIX 6.02

(See Paragraph 6.013)

STATEMENT SHOWING FREQUENCIES OF VARIOUS TESTS FOR EARTH WORK

SNo.	Name of Test	Investigation	Design	Construction	Record Test		Remarks
(1)	(2)	(3)	(4)	(5)	(6)		(7)
1	Moisture content.	..	..	Before the commencement of day's work/shift, one sample shall be tested for each of the construction soils separately. Sample is to be collected from the spot where the material is proposed to be brought on embankment.	..		..
2.	Specific Gravity.	For each 0.75 mm ³ of soil explored. 3 tests for every zone separately including filter. Three tests minimum for each quarry.	For each 0.15 mm ³ of each soil type investigated. 5 tests for each the zones including filter-5 tests minimum for each quarry.	As per record tests*	Only tests mentioned at S.No. 1 to 7, 9 to 12 are to be conducted as Record Tests.		..
3.	Grain Size Analysis.	For every 1 mm ³ or less soil explored, 6 tests for material to be used in each of the zones of the embankment Separately. 12 tests for filter zones. 3 tests minimum for each quarry.	For every 0.15 mm ³ or less of each soil type investigated for each zone 5 tests for each zone and 20 tests for filter. 5 tests minimum for each quarry.	Two samples for 150 m x 150m borrow areas proposed to be utilised. For any change of material minimum 2 samples shall be tested.	The frequency for each of these tests is as below :-		About 25 percent tests shall be conducted for analysing fraction below 75 micron
					Total Earth Work	Frequency (for earth work for each zone)	

SNo.	Name of Test	Investigation	Design	Construction	Record Test		Remarks
(1)	(2)	(3)	(4)	(5)	(6)		(7)
				For casing materials the test shall be conducted before and after compaction to study the breaking effects during compaction.	Below 0.5 mm ³ 0.5 mm ³ to 1.5 mm ³ 1.5 mm ³ to 3 mm ³ Above 3 mm ³	1 per 10,000 m ³ 1 per 15,000 m ³ 1 per 20,000 m ³ 1 per 40,000m ³	
*In addition to field density tests "Record Tests" are also conducted for earthen dams. The purpose of this tests is (i) To give a continuous picture of the materials placed in the dam and the compaction attained. This ensures a record of quality of work executed as compared with design assumptions. (ii) To check on the use of control curves when used. The record tests are carried out on representative samples both disturbed and undisturbed. The frequency of 'One Test' means an average of at least three complete tests. Separate tests are to be conducted for each zone.							
4.	Atterber'g Limits.	Same as above, no tests for filter material.	Same as above, no tests for filter material.	As per record tests.	Separate tests are to be conducted for each Zone. Samples to be collected from different locations and elevations so as to be <u>truly</u> representative.		..
5.	Shrinkage limit.	Not required.	Not required.	As per record tests.	In addition to the above, a set of record tests is to be taken at instrument installation. One undisturbed sample shall be taken at each embankment piezometer tip immediately prior to the excavation of offset side trench.		..
6.	Compaction .	For each 0.75 mm ³ soil explored, 12 tests for each zone separately; minimum 3 tests each quarry.	For each 0.15 mm ³ of each soil type investigated, 5 tests for each zone separately; minimum 5 tests for each quarry.	For total progress upto 1,500 m per day, One test/day shall be conducted i.e. one day on Hearting soil, next day of Casing soil, third day on Random fill and so on. If there be any change in soil, additional one test/day shall be conducted. For total progress beyond 1,500 m ³ per day, daily one test for each of the construction soils shall be conducted.	In case of vertical settlement guage installation, two samples shall be taken for each crossarm installation, one at the bottom of trench excavated for crossarm and the other in the tamped back fill of the trench after it has been brought up to the adjacent embankment level.		..

SNo.	Name of Test	Investigation	Design	Construction	Record Test	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
7.	Triaxial Shear.	For each 0.75 mm ³ of soil explored, 6 tests for each of the zones separately, minimum 3 tests for each quarry.	For each 0.15 mm ³ of each soil type investigated, 5 tests for each of the zones; minimum 5 tests for each quarry.	As per record tests.	Same as per S. Nos.1 to 7	
8	Relative Density.	Not required.	If directed specifically.	One test per 1,5000 mm ³ of material	Not required	..
9	Consolidation.	Not required.	As directed by Design Office.	As per record tests.	Same as per S. Nos. 1 to 7	..
10	Permeability.	5 tests on each type of soil.	2 tests for each zone separately including filter; minimum 5 tests for each quarry.	As per record tests.	-do-	..
11	Field Density for soil (sand replacement method).	..	..	Per day two tests per first 300 m ³ of Earth-work and then one test per every additional 300 m ³ separately; separate tests shall be conducted for each zone.	-do-	..
12	Field density test for soil (Core cutter method).	..	..	Same as per test No.11	Same as per S.No. 1 to 7	..
13	Placement Moisture (Penetrometer method).	..	..	One test per 20 sq.m. of the placed material before rolling, minimum 3 tests shall be performed on the placement.	Not required	..
14.	Needle Density (Penetrometer method).	..	..	To penetration resistance shall be observed at 20m. along length and breadth of area under compaction and also at places of doubtful compaction.	-do-	..

Note :- Tests should be conducted as per IS Codes.

APPENDIX 6.02**STATEMENT SHOWING FREQUENCIES****OF TESTS TO BE CONDUCTED FOR CONCRETE/MANSORY**

SNo.	Name of Tests	Mass Concrete		Small Concrete JObs & R.C.C. works		Rubble Masonry		Remarks	
(1)	(2)	(3)		(4)		(5)		(6)	
1.	Adulteration of Cement	One per every 50 tonnes of cement		One per every 50 tonnes of cement		Oneper every 50 tonnes of cement		Also carryout tests for cement as mentioned below at the same frequency	
2.	Particle size analysis of aggregates.	(i)	Once a week	(i)	Once a fortnight	(i)	Once a fortnight	(i)	Fineness of O.P.C. by dry sieving.
		(ii)	Additional if source is changed	(ii)	Additional if source is changed	(ii)	Additional if sources is changed.	(ii)	Setting times of O.B.C.
3.	Flakiness Index of coarse agreeate	As per above		As per above		Nil		(iii)	Soundness of O.P.C. (Le- Chaterllier method)
4.	Silt on fine aggregates	(i)	Once a day	(i)	Once a day	(i)	Once a day	(iv)	Deterinimg Consistancy of standard Cement Paste
		(ii)	Additional if source is changed	(ii)	Additional of source is changed	(ii)	Additional if source is changed		
5.	Clay, fine silt and fine dust in aggregate (Sedimentation method)	Once a Week							
6.	Surface moisture content in fine aggregate (Hot plate method)	Once per shift per stock pile		Once a fortnight		Once a fortnight		O.P.C. – Ordinary portland Cement	
7.	Surface moisture content in fine aggregate (Laboratory method)	Once a week		One per shift per stock pile		One per shift per stock pile			

SNo.	Name of Tests	Mass Concrete	Small Concrete JObs & R.C.C. works	Rubble Masonry		Remarks
(1)	(2)	(3)	(4)	(5)		(6)
8.	Bulking of fine aggregates.	One per shift per stock pile	Once a fortnight	Once a fortnight		
9.	Specific gravity and water absorption for aggregates (UP to 10mm size)	Once a week	One per shift per stock pile	One per shift per stock pile		
10.	Specific gravity and water absorption for aggregates (above 10mm size)	Once a week	Once a fortnight	Once a fortnigh		
11.	Fineness of lime			(i)	Once a week	
				(ii)	Additional if source is changed	
12.	Setting time of lime			(i)	Once a week	
				(ii)	Additional if source is changed	
13.	Soundness of line	..	..	(i)	Once a week	
				(ii)	Additional if source is changed	
14.	Compressive strength of lime motar	..	..	(i)	One per 50 m3 masonry	
				(ii)	Minimum one per shift	
15.	Transverse strength of lime mortar	..	..		Once a month	
16.	Fineness of surkhi by dry seiving			(i)	One per shift	
				(ii)	Additional if source is changed.	
17.	Compressive strength of cement surkhi motar	..	..	(i)	Up to 100 m3 work per day one per shift per mixer	

SNo.	Name of Tests	Mass Concrete	Small Concrete JObs & R.C.C. works	Rubble Masonry		Remarks
(1)	(2)	(3)	(4)	(5)		(6)
18.	Specific gravity and water absorption of stone.	..	..	(ii)	For every additional 100 m3 work per day. one per shift per mixer (Separately for each mix proportion)	
19.	Compressive strength of stone	..	..	(i)	One per fortnight.	
				(ii)	Additional if source is changed.	
20.	Fluidity of mortar by flow table	..	..	(i)	One per month	
				(ii)	Additional if source is changed.	
21.	Slump of cement concrete	One per every two hours working per mixer	One per every two hours working per mixer	Three per mixer per shift.		
22.	Density and air contents of fresh concrete	(i) One per mixer per week (ii) Additional if source of aggregate is changed	(i) One per mixer per month (ii) Additional if source of aggregate is changed	..		..
23	(a) Compressive strength of moulded cement concrete specimen.	(i) Upto 100 m3 work per day one per shift per mixer. (ii) For every additional 200 m3 work per day-one per shift per mixer	One per shift per mixer (Separately for each mix proportion)	(i)	Up to 100 m3 work per day – one per shift per mixer.	..
	(b) Compressive strength of mortar			(ii)	For every additional 100 m3 work per day-one per shift (Separately for each mix proportion)	
24.	Compressive strength of drilled cores.	As directed by Design. Office	As directed by Design. Office	As directed by Design. Office.		

SNo.	Name of Tests	Mass Concrete	Small Concrete JObs & R.C.C. works	Rubble Masonry	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
25.	Laboratory Permeability				
(a)	Moulded specimen.	One per month for every mix proportion	..	One per month for every mix proportion.	
(b)	Drilled core.	One per monolith per 3m depth.	..	One per monolith per 3m depth.	
26.	In-situ permeability	One hole at 20 m distance per working season for full depth duly staggered or minimum one hole per monolith.	..	One hole 20 m distance per working season for full depth (Separately for u/s and downstream faces duly staggered)	
				or	
				Minimum two holes per monolith.	
Note :- Tests should be conducted as per prescribed IS codes.					

[Appendix 7.01]

[See Paragraph 7.007]

CHECK LIST TO REVIEW LEVEL BOOKS**[Review in Division Office]**

1. Is the level book machine numbered ?
2. Are the pages of the level book machine numbered ?
3. Is the purpose of levelling “levels taken for the purpose of” written on the top of the left hand page ? The heading should be written for every day’s survey. In case the survey is continued, the same heading should again be written giving reference to previous survey. “Survey continued” “Concluded” etc., should be written and cross reference given.
4. Is the name of the person conducting levelling, the instrument number and make, and weather (like bright sun, cloudy, hazy, etc.) written on the top of right hand page ? In case double levelling is done, the name of person accompanying alongwith his designation should also be written. In such a case, the level books should be countersigned by the other person in token of having accompanied and the book number in which countersigning person has recorded levels will also be mentioned.
5. Has the day’s levelling started with a backsight on a temporary or permanent B.M. ?
6. Has a clear description of the B.M. written on the right side remarks column against the back sight ?
7. Is the description sufficient to locate the B.M. by any other person ?
8. Is the B.M. temporary B.M. or permanent B.M. ? In case it is permanent B.M., is the description and R.L. same as shown in b. M. Register ?
9. Is the pattern of levelling systematic and illustrated by a sketch (Base line and co-ordinate system is preferred for grid surveys) ? Can another person understand the scheme of levelling and plot it ?
10. Have the entries been made in indelible ink or in dot pen in the first instance ? (Recording in pencil and inking over is prohibited.)
11. Is the arithmetic check conducted for each page separately ?

12. Has the days survey ended on a permanent or temporary B.M. reliably established ?
 13. If the survey has not been closed on a G.T.S. or established B. M. is “FLY BACK” conducted and is closing error within permissible limits ?
 14. Is a clear index written at the end of the level book ?
 15. Are the pages inadvertently left blank crossed out ?
 16. Has the remark been given in redink that the survey has been plotted ?
-

[Appendix 7.02]
 RESPONSIBILITY CHART
(SEE PARAGRAPH 97.003, 7.009, 7.010, 7.011, 7.012, 7.013, 7.014)

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E.	S.E.	E.E.	S.D.O.	Sub-Engineer		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	I-Preliminary Investigation							
	Initiation of the Reconnaissance report in case of a							
	(a) Major Project	..	Full responsibility.	..	..	..	Para 7.002	..
	(b) Medium Project	..	..	Full responsibility.	..	..		..
	(c) Minor Project	..	..	..	Full responsibility.	..		..
2.	Preparation of survey estimate of all types of projects.	..	..	..	do.	Full responsibility		..
	II- DETILED IVESTIGATION							
3.	(a) Cheking R. Ls. of permanent Bench marks.		10%	25%	100%	100%	Para 7.003	..
	(b) Checking R. Ls. of final alignment of dam/canal/spill- channel and F.R.L. contour.	..	..	10%	100%	100%		..
	(c) Checking Bench Marks in Basin area during basin survey.	..	..	10%	100%	100%		..

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E.	S.E.	E.E.	S.D.O.	Sub-Engineer		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
4.	Computation of the catchments area of dam from toposheets in case of a -- (a) Major Project.	100% checking to be exercised by C.E.'s office.	100% checking to be exercised in Circle office.	100% checking to be exercised by E.E. personally.	Full responsi bility	..	Para 7.009	Certificates of checking will be invariably recorded by the officers on catchment area map.
	(b) Medium Project	do.	do.	do.	do.	..	..	..
	(c) Minor Project	..	do.	do.	do.	..	..	..
5.	Detemination of the principal levels (i.e. L.S.L.,F.R.L.,M.W.L. & T.B.L.) of the reservoir in case of a -							
	(a) Major Project	Full responsibi lity.	..	..	..	..	Para 7.009	..
	(b) Medium Project	Full responsibi lity.	..	..	..	..		..

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E.	S.E.	E.E.	S.D.O.	Sub-Engineer		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(c) Minor Project	Full responsibility for project costing more than Rs. 25 lakhs.	Full responsibility for project costing more than Rs. 5 lakhs and up to Rs. 25 lakhs.	Full responsibility for project costing up to Rs. 5 lakhs.	..	..		..
6.	Computation of the reservoir storage capacity from reservoir sheets/basin map in case of a -							
	(a) Major Project	..	..	The area of contours at L.S.L., F.R.L. and M.W.L. will be checked by the E.E. personally.	The area of contours at every 3 meters interval will be checked by the S.D.O. personally.	The area of all contours of the basin map will be worked out by the Sub- Engineer.	Para 7.009	Certificate of checking shall be recorded by the officers responsible for checking.
	(b) Medium Project	..	..	do.	do.	do.		..

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E.	S.E.	E.E.	S.D.O.	Sub-Engineer		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(c) Minor Project	..	..	The area of contour of F.R.L. will be checked by E.E. personally.	The area of contour of L.S.L., F.R.L. and M.W.L. will be checked by the S.D.O. personally.	do.		..
7	Fixing the location of reconnaitary bore holes on dam axis/spill channel for exploration of foundation/establishing the rock line in case of a - (a) Major Project	Full responsibi lity (in consultati on with Engineeri ng Geologist)	..	..	..	..	Para 7.003	

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E.	S.E.	E.E.	S.D.O.	Sub-Engineer		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(b) Medium Project	..	Full responsibility (in consultation with Engineering Geologist).	..	..	..		..
	(c) Minor Project	..	..	Full responsibility (in consultation with Engineering Geologist).	..	..		..
8.	Preservation of cores obtained from the reconnoitary bore holes in core boxes and their proper logging in case of all categories of project.	..	..	..	Full responsibility.	..		Logging for bore holes to be done/verified by Engineering Geologist.
III- LAND ACQUISITION								
9.	Preparation of land plans	..	..	..	100% checking to be exercised by the S.D.O.	Full responsibility.	Para 7.010	..
10.	Upkeep of sale deeds	..	..	Full responsibility.	Full responsibility.	..	Para 7.010	..

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E.	S.E.	E.E.	S.D.O.	Sub-Engineer		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
11.	Upkeep and custody of land plans/register of Land and property	..	..	-do-	-do-	..		..
	IV Execution							
12.	Approval of the final dam alignment before starting construction work in case of a -							
	(a) Major project	Full responsibility.	..	..	..	..	Para 7.011	..
	(b) Medium project	do.	..	..	..	..		..
	(c) Minor project	Full responsibility for projects costing more than Rs. 25 lakhs.	Full responsibility for projects costing more than Rs. 5 lakhs up to Rs. 25 lakhs.	Full responsibility for projects costing less than Rs. 5 lakhs.	..	..		..
13.	Approving the foundation of a masonry or concrete dam/spillway/power house and authorising laying of foundation concrete in case of a -							

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E. (3)	S.E. (4)	E.E. (5)	S.D.O. (6)	Sub-Engineer (7)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	(a) Major project	Full responsibility.	..	..	..	..	Para.7.012	..
	(b) Medium project	..	Full responsibility.	..	..	..		..
	(c) Minor project	..	..	Full responsibility.	..	..		..
14.	Approving the foundation of an earthen dam and authorising filling of puddle trench/cut-off trench in case of a -							
	(a) Major Project	Full responsibility.	..	..	..	..	Para 7.012	..
	(b) Medium Project	..	Full responsibility.	..	..	..		..
	(c) Minor Project	..	Full responsibility for project costing more than Rs. 5 lakhs.	Full responsibility for projects costing up to Rs. 5 lakhs.	..	..		..

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E.	S.E.	E.E.	S.D.O.	Sub-Engineer		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
15.	Approving the foundation of Hydraulic structures other than dam.	Full responsibility for Major Project as per powers of technical sanction.	Full responsibility for Medium Project as per powers of technical sanction.	Full responsibility for minor project as per powers of technical sanction.	..	..	Para 7.012	..
16.	Quality Control for :							
	(a) Major dams and hydraulic structure costing more than Rs. 50 lakhs.	Full responsibility.	Full responsibility.	Full responsibility.	Full responsibility.	Full responsibility.	Para 6.001 to 6.023	..
	(b) Medium dams and structures costing more than Rs. 25 lakhs up to Rs. 50 lakhs.	..	do.	do.	do.	do.		..
	(c) Minor dams and structures costing more than Rs. 5 lakhs up to Rs. 25 lakhs.	..	..	do.	do.	do.		..
	(d) Structures costing less than Rs. 5 lakhs.	..	..	..	do.	do.		..

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E. (3)	S.E. (4)	E.E. (5)	S.D.O. (6)	Sub-Engineer (7)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
17.	To record the pre commencement levels and their checking before excavation of foundation for a masonry/concrete dam/spill way.	..	..	10% of levels will be checked by the E.E.	100% of levels will be checked by the S.D.O.	The pre commencement levels will be recorded in M.B. by the Sub-Engineer.	Para 7.012	
18.	To record the foundation levels and their checking.	..		10% of levels will be checked by the E.E.	do.	Levels will be recorded in M.B. by Sub-Engineer.	Para 7.012	
19.	Checking of steel reinforcement in R.C.C. of-							
	(a) Dams/Spill ways/Outlet works in dam/power houses.	..	..	100% checking will be exercised by the E.E.	100% checking will be exercised by the S.D.O.	Measurements of steel reinforcement will be recorded in M.B. by the Sub-Engineer.	Para 7.014	
	(b) Beams/Slabs/columns of buildings/bridges/culverts/aqua ducts/other minor works.	..	..	Minimum 10% checking will be exercised by the E.E.	100% checking will be exercised by the S.D.O.	Measurements will be recorded in M.B. by the Sub-Engineer.		

S. No.	Particulars	Responsibility of					Reference to paragraphs	Remarks
		C.E.	S.E.	E.E.	S.D.O.	Sub-Engineer		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
20.	Checking of leads of construction materials in case of -							
	(a) Dams	..	..	100% checking will be exercised by E.E.	100% checking will be exercised by the S.D.O.	Measurements will be recorded by the Sub-Engineer.	Para 7.012, 7.013 and 7.014	
	(b) Canals, buildings, roads and canal masonry works.	..	..	10% checking will be exercised by the E.E.	100% checking will be exercised by the S.D.O.	Measurements will be recorded by the Sub-Engineer.		..
21.	Custody of all completion drawings in case of-							
	(a) Major Project	..	..	Draftsman in Division Office	..	..	Para 7.012, 7.013 and 7.014	..
	(b) Medium Project	..	..	do.	..	..		
	(c) Minor Project	..	..	do.	..	..		

Note :- (1) Percentage checks should be selective so that they reveal the accuracy of the whole work.
 (2) Percentage checks should not fully overlap the checking done by the lower officer.
 The original work and checking should not be simultaneous

Appendix 8.01

(See paragraph 8.014)

RECORD OF WATER PASSED OVER SPILLWAY / WASTE WEIR**Name of tank / reservoir Month****Year**

Date	Time	Gauge	Head due to velocity of approach	Mean depth over weir (Head over crest)	co-efficient of discharge	Hour	Discharg e over the weir during the day in Cumecs	Total discharge to date from 1st of June	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

-
- Note :-** (1) The formulae to be adopted for Col-6 shall be as adopted for the design of the Spill way/Waste weir.
- (2) The Bench Mark of datum to which the gauge reading in col.-3 refers should be mentioned.

Appendix 8.02

(See paragraph 8.014)

RECORD OF RESERVOIR TANK GAUGE**Name of tank / reservoir** **Year**

Date	R.L. of gauge at 8 A.M.	Contents of tank in cubic meters corresponding to gauge in col.(2)	Increases of contents since previous date in Cubic metres	Decreases of contents since previous date in Cubic metres
(1)	(2)	(3)	(4)	(5)

Quantity of water used for irrigation in Cubic metres	Quantity of water passed over the weir during the day in Cubic metres	Total Quantity of water received due to rainfall in Cubic meters	Quantity of water lost due to evaporation in Cubic metres	Remarks
(6)	(7)	(8)	(9)	(10)

Appendix 8.03

(See paragraph 8.014)

Performance Table of Head Works

S. No.	Name of reservoir / tank	Catchment area in Sq. Kms.	Rain fall in mm.	Actual yield received in m ³	Actual run off in mm	Percentage [(Col.-9)/(Col.-5)] x 100					
			During the month	Total from 1st June	During the month	Total from 1st June	During the month	Total from 1st June	During the month	Total from 1st June	Balance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Quantity of water passed over the waste weir in m ³			Quantity of water passed for Irrigation in m ³			Quantity of water stored in tank in m ³			Quantity of water in tank above L.S.L. in m ³		
During the month	Total from 1st June	During the month	Total from 1st June	During the month	Total from 1st June	During the month	Total from 1st June	During the month	Total from 1st June		
(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)				
Quantity of water in tank above L.S.L. in m ³			Quantity of water lost by evaporation and absorption			Depth of water lost due to evaporation and absorption in m ³			Area irrigated to date and duty achieved		
On 1st June	At the beginning of the month	At the end of the month	monun	Total from 1st June	During the month	To date from	Kharif	Rabi	Perennial		
(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)		

Note :- To be submitted monthly by the Sub-Divisional officer to the Executive Engineer and by the Executive Engineer to the Superintending Engineer and by the Superintending Engineer to Chief Engineer.

Appendix 8.04

(See paragraph 8.015)

Canal Gauge Register

Date	Canal Gauge at			Discharge at canal head
	8.00 A.M.	12.00 Noon	4.00 P.M.	
(1)	(2)	(3)	(4)	(5)

Total Quantity of water passed during the day	Total Quantity of water supplied up to date	Area under Irrigation	Delta achieved by end of the month	Remarks
(6)	(7)	(8)	(9)	(10)

Appendix 8.05

(See paragraph 8.015)

Performance Report of Canals

Name of Project

Head discharge

F. S. L.

Side Slopes

Bed width

S.No.	Name of Canal	Total water released during the month	Total water released up to the end of month	Area Irrigated up to date	Delta achieved at the end of month	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Appendix 8.06

Periodical (Bi-Annual) Inspection Register

(See paragraph 8.017)

(A) DAM (HEAD WORKS)

PROFORMA for Periodical Inspection of Dams with Ungated Waste Weir

SALIENT DATA OF SCHEME.

1. Name of Dam..... 2. SRLD No. 3. District
4. Division 5. Circle 6. Basin
- 7a Category of Dam 7b. Officer required to inspect.....
 (1,2,3,4 or 5 as per size) (CE, SE, EE, AE or Sub-Engr.)
8. Date of Inspection

S. No.	Item	Remarks
1	2	3
	A-GENERAL	
1.	Name of Project.	
2.	Purpose of Project (Water Supply \ Power \ Multipurpose \ Irrigation).	
3.	Name of Dam.	
	(a) Latitude and longitude.	
	(b) Catchment area.	(Sq. Km)
4.	Year of completion.	
5.	First filling (year\levels)	
6.	A- Benefits assured:	
	(a) Irrigation	(Hectare)
	1. Kharif = 2. Rabi =	
	3. Perennial = 4. Total =	
	(b) Water Supply.	(Th. Cum)
	(c) Other benefits	
	B- Benefits achieved preceeding year:	
	(a) Irrigation.	(Hectare)
	1. Kharif = 2. Rabi =	
	3. Perennial = 4. Total =	
	(b) Water Supply.	(Th. Cum)
	(c) Other benefits	
	7. Important Controlling Levels.	(in meters)
	(a) Top of dam.	
	(b) Maximum water level.	(m)
	(c) Full reservoir level.	(m)
	(d) Sill level of Irrigation sluice.	(m)
	(e) Spillway crest level.	(m)
	(f) Minimum Drawdown level.	(m)
	(g) Lowest river bed level.	(m)

- (h) Deepest foundation level. (m)
- 8. Important Salient Features:**
- (a) Dead storage capacity. (Th. Cum)
- (b) Area of foreshore at FRL. (Hactare)
- (c) Design flood adopted.
- (i) PMF/SPF/ Any other.
- (ii) Give relevant magnitude.
- (d) (i) Design spillway discharge capacity. (cumecs)
- (ii) Length of spillway with location.
- (e) (i) Location, sill level.
- (ii) Capacity of low level outlets. (cumecs)
- (iii) Scouring sluices. (cumecs)
- (f) Height of the dam. (in metres).
- (i) Above deepest foundation. (m)
- (ii) Above lowest river bed. (m)
- (g) Gross Storage Capacity.
- (i) At FRL. (Th. cum)
- (ii) At MWL. (Th. cum)
- (h) Length of the dam at crest. (m)
9. Name and designation of the inspecting officer.
10. (i) Date of Inspection.
- (ii) Corresponding Reservoir Water Level. (m)
11. Water level reached during the last season with dates. (m)
- (i) Maximum RL.
- (ii) Minimum RL.
- (a) Water level reached above designed MWL since construction with dates. (m)
1. RL () 2. RL ()
3. RL () 4. RL ()
12. Maximum overflow during preceding monsoon with dates. (Th. Cum)
1. () 2. ()
3. () 4. ()
- (a) Maximum overflow since construction with year as above vide 11(a). 1. (Th. Cum)
13. History of past distress, if any, and brief details of remedial measures carried out.
14. Does the Officer-in-Charge of the Operation and Maintenance of dam possess all the records as given in the Annexure-1, if not, indicate action being taken to complete these.
15. When and by whom was the dam inspected immediately preceding this inspection ?
16. Are the items pointed out during the last inspection properly attended to ? If not, state deficiency yet to be corrected.
17. Whether catchment area has been verified on the basis of latest toposheets? If yes, state the outcome.

I - Prescribed Proforma For Periodical Inspection of Dams with Ungated Waste Weir (Dams & Ancillary works.)

Sr. No.	Item of Inspection	Observation & Recommendations if any of the Inspection Officer	Remark of Reviewing Officer
1	2	3	4
	B-Earth dam with ungated surplussing arrangements		
	1. Downstream drainage :		
1.(a)	Are there any signs of water logging slushy condition or growth of aquatic weeds on the downstream of the dam?		
(b)	Are there any standing pools of water in the downstream area of dam? If so give their locations and extent.		
(c)	Are there any boils observed in the vicinity of the down stream toe of the dam ?		
(d)	Is the downstream area sufficiently clear and free draining?		
(e)	What is the depth of ground water table on the downstream as evident from the existing wells in the vicinity of the dam? Does the water table show any marked variation in accordance with the reservoir water level?		
(f)	Are the exposed drains working satisfactorily?		
(g)	Toe drains and cross drains:		
	i) Are the portions of longitudinal toe drain and exposed cross drains beyond the downstream toe of the dam in regular section and freely draining ?		
	ii) Is the pitching to these drains intact ?		
	iii) Is there any weed growth in these drains ?		
	iv) Indicate other defects noticed in these drains, if any.		
h)	Outfall drain:		
	i) Is the outfall drain in proper shape and grade and freely draining?		
	ii) Is the outfall drain properly cleaned and maintained ?		
	iii) Does the outfall drain show any stagnant of water of weed growth?		
	2. Surface drainage of downstream slope:		
2.(a)	Is the condition of the downstream slope drainage arrangements satisfactory ?		

- (b) Is the paving to these drains intact ?
- (c) Are all the drains properly maintained and free of vegetation growth and debris ?
- (d) Does the slope have a tendency to develop severe rain cuts at any location ?
- (e) Enumerate any other defects noticed in the surface drains of downstream slope.

3. Seepage measurements:

- 3.(a) Is the quantity of seepage being daily or periodically measured with respect to water level in reservoir and recorded ? Please check the registers and records observations.
- (b) Does it show any abnormal rise or fall ? if so, does it have any relation to certain reservoir level elevations ?
- (c) Does the seepage flow show a turbid colour at any stage? Was such a phenomenon observed at any stage at any location in the past?
- (d) What is the measured rate of seepage flow with date and reservoir level ?
 - i) On the day of present inspection.
 - ii) Maximum since last June.
 - iii) Minimum since last June.
- (e) Is the portion upstream and downstream of measuring points of seepage easily accessible with proper steps and path, and free of vegetation growth ?
- (f) Are the measuring points properly located constructed and maintained so as to give accurate and reliable measurements of seepage ?
- (g) Is the method of taking seepage measurements satisfactory ?
- (h) What is design seepage discharge ? State your observation on comparison ?
- (i) Are the toe drain, out fall drain and cross drains completely dry ?

4. Earth dam section crest:

- 4.(a) Is the crest profile at proper elevation? Does it show any sign of excessive and/or uneven settlement ? if so, indicate such locations and extent of settlement (Surface settlement points must be installed for observing this aspect).
- (b) Is the surface of the crest free from Undulations and local depressions or heaving ? Does it provide an all weather road surface ?

- (c) Does it develop any visible cracks in transverse or longitudinal directions ? If so, attach a map showing their locations and extent and shape. Depth and width of cracks must be ascertained by taking open trenches extending below the bottom of cracks.
- (d) What is the condition of the edges of crest ? Is ramp provided ? Any road crossing provided ? Have they got eroded and cut up resulting in reduced effective width ? If so, attach a map showing their location, shape & extent.
- (e) Is the crest free from local slips throughout its length on either sides ?
- (f) Do the headers, guard stones and parapet wall provided at the edges of the crest appear in proper profile and plumb ?

5. Earth dam section - Upstream and Downstream slopes:

(Indicate the general condition of upstream pitching, downstream pitching/ turfing and rock toe.)

- (a) Do the upstream and downstream slopes show any sign of bulging or concavity ? If so, indicate their locations and extent.
- (b) Does the section of the dam and both the slopes appear structurally sound and stable ?
- (c) Are any longitudinal or transverse cracks noticed at any part of the slopes ?
- (d) Were any signs of distress to stability of slopes noticed at any time in any part of the dam ? If so give brief detail of the incidents & location, the method of treatment adopted and its effectiveness. Indicate the general condition of upstream pitching downstream pitching/turfing and the rock toe.
- (e) Is there any profuse growth of bushes or weeds over any portion of the dam ? If so, indicate the locations.
- (f) Do the upstream or downstream slopes show existence of crab holes made by rodents or burrowing animals or anthills ? If so, indicate the locations.
- (g) Are there any wet or slushy patches and concentrated leak spring or trickles observed on the downstream slopes or the toe ? If so, indicate their locations and

extent. Please look out for patches or extensive vegetation growth and examine them carefully and record your finding.

- (h) Are all the train cuts & erosion channels properly treated & made good?
(Please indicate location of recurring damage, if any.)

6. Junction of earth work with Masonry Concrete dam section and sluices:

- 6.(a) Is there any existence of leaks , spring or wet spots in the earth work in the vicinity of the junction between earth work and masonry works.
- (b) Is there any tendency for separations, cracking, settlement or up-heaval of the earth work in the vicinity of masonry or concrete? If so, indicate the locations and exact nature of deficiency.
- (c) Is there any tendency for surface erosion at the junctions ?
- (d) If the sluice conduit is located in the earth dam section, Is entire length of the conduit in perfect order and profile and free from off sets, open joints, cracks and leakage?
Examine the conduit carefully from the down stream or from inside if possible and indicate the deficiency observed if any.
- (e) Check the conditions of the crest and slopes specially in the zones adjacent to concrete structures.
Detect the deformations, settlements, cracks or other distress conditions caused by external erosion due to wind rain etc. Set up permanent observation system for the same at the places of occurrence. Seepage at junctions between earth dam and masonry/ concrete, retaining wall or corch type junctions with concrete dam is a possible source of trouble and should be carefully watched.

7. Relief Wells:

- 7.(a) Are the relief wells in good working condition and functioning well?
- (b) Are the relief wells properly cleaned periodically?
- (c) Please indicate the dates of last cleaning and the next cleaning due.
- (d) Are the necessary plant and equipment for cleaning the relief wells available with the office ?

8. Breaching Section (If Provided)

- 8.(a) Is the breaching section easily accessible.
- (b) Is the conditions of the breaching section satisfactory?
- (c) Is the note of instructions as to when and how to operate the breaching section available on record?
- (d) For reconstruction after the breach, are the following items decided in advance.
 - (i) Quarry for embankment material.
 - (ii) Suitable routes of access.
 - (iii) Agency, plant and machinery for its reconstruction.
- (e) Is the maintenance staff fully aware of the instructions at (c) and (d) above?
- (f) Ascertain and indicate the latest event of operation of breaching section and its performance.`
- (g) Is the surplus course from the breaching section acquired upto natural valley?
- (h) Is the course formed?
- (i) Is the surplus course assigned later as agriculture land or house site?
- (j) If so, what steps are taken?

9. Upstream and downstream faces of waste weir and falls in spill channel:

- 9.(a) Examine the monolith and construction joints for such defects as cracks, open joints, spalling, seepage, leaching etc. and indicate the findings.
- (b) Is the upstream face of the waste weir/ falls in good condition?
If not, indicate the nature and extent of deficiency.
- (c) Is any spalling or cracking observed on the downstream face specially near the zone of concentration of stresses like the toe or location of abrupt change in geometry or at the crest?
If so, indicate details of observations.
- (d)
 - i) Is there excessive seepage/sweating at any location on the down stream face of the waste weir/falls?
 - ii) Whether the observations are analysed and compared with the theoretical assumptions made in the design?
 - iii) Remedial measures in case of large variations.

10. Approach Bridge to sluice tower and other bridges where applicable:

- 10.(a Are the decking, girders and structural supports of approach bridge to sluice tower structurally sound ?
- (b) Is the floor of the bridge structurally sound and safe ?
- (c) Is there satisfactory arrangements to prevent unauthorised entry into the control structures and bridges?
- (d) Are the structural members and joints sound and free from corrosion ?
- (e) When were the steel components painted last ?
- (f) Is the surface of steel work and paint satisfactory ?
- (g) Is the parapet or railing over the bridges sound and safe?

11. Energy dissipation arrangements provided on downstream of waste weir:

- 11.(a Can the tail pond be drained easily for inspection of the stilling basin ? If not, what are short comings ?
Please ascertain and indicate the last event of inspection of stilling basin.
- (b) From the examination of the levels and Contour plans and reference marks in tail channel; ascertain if there is progressive erosion and retrogression in the tail channel, If so, indicate the extent and location of such erosion with reference to the various components of dam, spillway, outlet, power house etc.
- (c) Is the concrete surface of the stilling basin and apron in good condition? Are there any indications of pitting, cracking, spalling or wearing of the surface of bedding concrete ?
If so, please give the details of the nature and extent of the damage.
- (d) Is there any indications of abrasion and cavitation damage (pitting or concrete) especially at friction block, chute blocks, the surface near the lower tangent point and the end sill ?
If so, please give the details of the nature and extent of the damage.
- (e) Is the under-drainage of the stilling basin satisfactory ? Are all the open drain holes clear and functioning well?

12. Walls (Guide wall/Divide wall/ Junction wall/ Return wall etc.) : (Strike

out whichever is not applicable).

- 12.(a Are all the location of such wall accessible
) for inspection, maintenance and repairs.
(b) Is the drainage of back sides of the walls.
(wherever applicable) through the weep
holes satisfactory ?
If not, indicate the nature of deficiencies.
(c) Is there any tendency for the water to under
cut the ends of the walls ? If so please give
details of nature and extent of damage.
(d) Is there any foundation erosion or scour
noticed in the vicinity of such walls ? If so,
give the details of nature and extent of such
damage.
(e) Is there any surface erosion/damage caused
to face or body of such walls ?
(f) Do any of the walls show symptoms of
unequal settlement, development of
cracks and tilting ? If so, give details of
the defect, noticed.
(g) Is there any damage to guide bunds? if so,
give details of the damage.

13. End Weir (Waste weir) :

- 13.(i Is it accessible ?
)
(ii) Is there any erosion, pitting or spalling of
the surface near the lower tangent point ? If
so, give details.
(iii) Is there any scour noticed on the immediate
downstream of such weir? If so, give
details of location and extent of such
damage.

**14. Hydraulic performance of Energy
dissipation arrangements provided at
Waste Weir or in Spill Channel:**

- 14.(a Do the flow conditions in the stilling basin
) have a tendency to draw rocky material
into the bucket and cause its churning and
abrasion damage to the surface of bucket,
baffle blocks, apron and end sill ?
(b) Is the hydraulic performance in proper
agreement with the results of model
studies?

Ascertain the performance from observed
tail water rating curves and deficient
observation if any as weep outs and
excessive erosion under plunge pools and
location of secondary rollers and
retrogression.

15. Approach & spill channel:

15.(i) **Approach channel:**

-)
- (a) Is the approach channel excavated as per design section ?
 - (b) From the examination of levels ascertain that levels are as per design profile.
 - (c) Is there any erosion or retrogression in the channel ?
 - (d) When the erosion/retrogression was first noticed ? (give the month\year).

(ii) **Spill channel:**

- (a) Is the spill channel excavated to the design section & profile to take the design discharge ?
- (b) If not so, state upto what extent it is capable to take the design discharge ?
- (c) Is there any scouring, erosion or retrogression observed in the channel ?
- (d) When the erosion/retrogression was first notice ? (mention month / date).
- (e) If the spill channel is designed as flumed section , state if it is as per the designed flumed section.
- (f) Is there any obstruction created in the spill channel ?

16. Instruments installed and observations:

- 16.(a
-) Are all the instruments installed properly accessible ? Are all the locations properly lighted, ventilated, and adequately protected from possibilities of damage ?
 - (b) Are all the instruments in proper working order ? Ascertain the cases of instruments going out of order and indicate.
 - (c) Are all the registers of observations posted upto date ? Please take test observations and initial the registers.
 - (d) Are all the plotting of the instruments data completed upto date ?
 - (e) Are sufficient stocks of spares, gauge, master gauges, stationary, items etc. maintained at the site for uninterrupted data collection ?

17. Outlet (Sluices):

- 17.(a
-) Is the air vent periodically cleaned ?
 - (b) Are there any structural damages to the intake wells such as leakage noticed through wells ?
 - (c) Is there any leakage observed through the

conduit concrete or masonry? If so, give details of its location and extent.

- (d) Is there any damages noticed to the conduit concrete, breast wall and gate slots ?
- (e) Take operating trials of the following as provided and record the observations and defects noticed if any.
 - (1) Service-gates
 - (2) Emergency-gates.
- (f) Are the trash racks (wherever provided) cleaned before monsoon ?
- (g) Are there vibration and noise noticed in operation of outlet gates at any time ? If so, are any periodical observations taken to ascertain their severity ?
- (h) Is the energy dissipation arrangement working satisfactorily for all discharges ?
- (i) Is there any structural damage to the energy dissipation structures ? If so, give the details of nature and extent of damage.
- (j) Is the conduit structurally sound and reasonably leak proof ? If not, give details of natures and extent of the defect. Is it possible to examine the conduit from inside ?
- (k) Is there any seepage noticed around the conduit as ascertained from the observations of the downstream conditions ? If so, is it likely to cause erosion and piping ?

18. Outlet Gates (Sluice gates);

- 18.(a) Is the surface of gates and the paint deteriorated ?
- (b) Are the connecting bolts of rubber seals loosened or damaged ?
- (c) Do the rubber seals show signs of weathering and damage and need replacement ?
- (d) Are the rubber seals of sides and bottom touching the bearing surface uniformly ?
- (e) Do all the rollers touch the track plates ?
- (f) Are the rollers well lubricated ?
- (g) Is the operation of outlet gates smooth ?
- (h) Are the stem rods for lifting the gates straight ?
- (i) Condition of steel wire rope and last date of oiling and greasing .
- (j) Are the actual operation of lifting and lowering of the gates and hoist mechanism smooth and satisfactory ?

- (k) Are all the gears and hoist mechanisms well lubricated ?
- (l) Are the seal plates in sound conditions ? If not ascertain the type of damage and indicate.
- (m) Are all the nuts of connecting bolts and anchorage properly tightened ?
- (n) Are all the lifting beams in proper order and sound condition ? If not, ascertain the nature and extent of damages and indicate.
- (o) Do any of the mechanical or structural parts of the gates, fasteners or hoists show signs of excessive wear ? If so, please give details.
- (p) Is there any tendency for recurring damage of any particulars component or components ? If so, give details .
- (q) Is sufficient stock of spares which needs frequent replacement maintained at the site ?
- (r) Whether hand cranks are kept under lock and key and not attached on hoist mechanism when operated by electrical energy ?
- (s) Whether warning sign indicating "Danger, Do not switch on " is hung during maintenance ?

19. Emergency Preparedness:

- 19.(a) Are the Project Officers well conversant with the Emergency Action plan , Reporting procedures and warning procedures ?
- (b) When was the Emergency Action plan last reviewed ?
- (c) Are the communication directories updated ?
- (d) Are the concerned authorities informed about the system of emergency reporting procedures and warning ?
- (e) Are the inundation maps updated ?
- (f) Are available safety spots on the downstream of the dam identified and made known to the concerned authorities ?
- (g) Are adequate warning devices and facilities provided at the dam ?
- (h) Is the downstream warning system operational ?
- (i) Are proper arrangements made for security of the dam and preventing cases of unauthorized trespass, vandalism and

sabotage to the dam works ?

20. Access Roads :

20. Is there a properly constructed and well maintained all weather access road to the dam site ?

- (a) What is the type of pavement of the access road and its condition ?
- (b) Are there properly constructed and well maintained access roads arrangements to the following components for inspection, maintenance and repairs ?

(1) Top of dam.

(2) Toe of earth dam downstream drainage arrangements and berms.

(3) All saddle dams.

21. communication facilities :

21. Are following facilities available at dam site and are in working order ?

1) Wireless.

2) Telephone.

3) Telegraph.

22. General Assessment of condition of the dam :

- 22. Please give general assessment of safety of dam for normal operation please enumerate all your observation which you feel adverse to the safety of the dam for normal operation.

Seal & Signature

Seal & Signature

ANNEXURE I- RECORD REQUIRED AT SITE

(Referred to in item 14 of A- General)

Records that may be required for proper inspection and maintenance shall be available at site. These shall be properly maintained and kept up to date by including latest information available. Data in respect to upstream gauging station., flood warning system and communication channels, if installed, shall be properly maintained

Sr. No.	Item	Whether available or not.	If not action taken to complete.
1	2	3	4

1. General:

- 1. Final detailed project Report and details of modifications done during construction and a set of final drawings (as executed).
- 2. Index plan of the area in which the dam is located showing important towns, roads, rail routes and communications facilities.

3. Index plan of downstream area showing natural flood zones, flood zones corresponding to spillway design flood and dam break flood and all important town/villages properly lying in these flood zones.
4. Contour map of dam site extending upto 200 m or 10 times the dam height (whichever is less on upstream and downstream showing all features of the dam like toe lines, fills, drains, relief wells, access roads etc.
5. Record drawings of longitudinal section of dam foundation or cut off trench showing details of foundation stratigraphs, stagewise construction of COT, filling and raising of dam section embankment, zoning details and foundation treatment.
6. Record of drawings of cross sections of dam showing detail of foundation treatment, under seepage control, zoning, internal and external drainage, all protective arrangements and stage wise construction.
7. Contour plan of dam site with foundation trench showing details of foundation treatment and foundation drainage.
8. Contour plan of reservoir basin.
9. Contour capacity and area capacity curve.
10. Reservoir maps showing silted basin, if observed.
11. Plan of the catchment area showing rain gauge stations and capacities of upstream storage.
12. Material properties adopted for design.
13. Details of design criteria followed.
14. Design report on flood studies and spillway design flood.
15. Design reports of sluice, power outlets, river sluices, intake conduit, energy dissipation arrangements and details of gates of hoists.
16. Geological data of the foundation and abutments.
17. Copies of geological reports, details of specials foundation and abutment treatment carried out.
18. Record of tail channel geology and tail channel erosion.
19. Instrumentation drawings with detail.
20. Instrumentation data and behavioral record.
21. Details of communication system. telephones, wireless etc. directory of important key officers, flood warning procedure.
22. Flood forecasting system.
23. Photographs, showing various phases of construction preconstruction etc.

2. Earth & Rock fill dams:

1. Stagewise construction record of the dam showing volumes and heights achieved in each season and time rate of progress.
2. Record of special compaction done near concrete / masonry structures, abutment contact and outlet locations, if available.
3. Summarized records of compaction control, sampling and complete laboratory and field test results on all recorded samples.
4. Foundation details and geology as observed.
5. Data of water intake test.
6. Detailed drawings and record of relief well observations.
7. Design report for the earth dam, covering the under seepage control, stability of embankments junctions with masonry dam, instruments installed etc.
8. Drawings showing the typical cross sections, including zoning drainage arrangements details, details of slope protections provided for etc. as per actual construction.
9. Details and location of instruments embedded in and around the structures.
10. Record of corrective measures, repairs and treatment that have been down subsequent to construction.
11. Details of design criteria followed.
12. Photographs showing all phases of construction.
13. Important inspection reports and reports of consultants.

3. Concrete & Masonry Dams:

1. Details of construction history including stages of construction particularly in low blocks where considerable time elapsed prior to resumption of work.
2. Summarized data on control tests carried out during construction in respect of concrete, mortar and their constituent materials, if available.
3. Reports on hydraulic model studies.
4. Drawings showing the detail of energy dissipation arrangements, including foundation level of apron, training walls and end weir.
5. Details and location of instruments embedded/installed in and around the structure.
6. Summarized data of observation on embedded-installed instruments.
7. Detailed drawings of all service facilities like internal lighting emergency lighting, drainage etc.
8. Drawing showing the uplift measurement and pressure relief arrangements.

9. Summarized data of uplift pressure observed.
10. Summarized data of seepage, leaching observed in the drainage gallery and downstream face of the dam, their location etc.
11. Record of corrective measures, repair or treatment that have been done subsequent to completion.
12. Important inspection reports and report of consultants.
13. Details of design criteria followed
14. Photographs showing all phases of construction.

4. Operation & Maintenance:

1. Gauge data of the river prior to the construction and after completions of work.
2. Detailed observations of flood discharges.
3. Detailed observations of hydraulic performance of energy dissipation basins.
4. Record of past performance stating briefly the defects developed and remedial measures carried out.
5. Drawings of outlets, maximum discharge capacity, maximum design operating head.
6. **Standing orders regarding operation of the dam:**
 - (a) Designers operating criteria.
 - (b) Standing operating procedures.
 - (c) Flood forecasting procedures.
 - (d) Emergency action plan.
7. Standard reference literature for operation and maintenance of reservoir, dam, ancillary work, gates , instrumentation etc. including Specifications, I.S. Codes, manufacturers manual/literature etc.

Note: Indicate in brief the progress (since last report) on compilation/procurement of above items, where not available, but desirable.

Seal & Signature

II. PROFORMA FOR PERIODICAL INSPECTION OF DAMS WITH GATED SPILLWAY

DATE OF INSPECTION.....

A. GENERAL

S. No.	Item	Remarks
(1)	(2)	(3)
1.	Name of Project	
2.	Purpose of Project: Water supply/Power/Multipurpose/Irrigation.	
3.	Name of Dam	
4.	Year of completion	
5.	First filling (Years/Levels)	
6.	Benefits assured: (a) Irrigation (b) Water Supply (c) Power (d) Other benefits.	
7.	Important Controlling Levels (in metres)	
	(a) Top of dam	
	(b) Maximum water level	
	(c) Full reservoir level	
	(d) Sill level of Irrigation sluices	
	(e) Sill level of scouring sluices	
	(f) Spillway crest level	
	(g) Minimum drawdown level	
	(h) Lowest river bed level	
	(i) Deepest foundation level	
8.	Important Salient Features	
	(a) Dead Storage Capacity	
	(b) Area of foreshore at F.R.L.	
	(c) Design flood adopted: (PMF/SPF/Any other) Give relevant magnitude.	
	(d) Design spillway discharge capacity and type of spillway.	
	(e) Type, number and size of spillway gates.	
	(f) Location, sill level and capacity of low level outlets and scouring sluices.	
	(g) Height of the dam in metres: (i) above deepest foundation; (ii) above lowest river bed.	
	(h) Gross storage capacity in million cubic metres:	

S. No.	Item	Remarks
(1)	(2)	(3)
	(i) At F.R.L.	
	(ii) At M.W.L.	
	(i) Length of the dam (at crest) in metres.	
9.	Name and designation of the inspecting officer.	
10.	Date of inspection and the corresponding Reservoir Water Level.	
11.	Maximum and minimum water levels reached during the last season with dates.	
12.	Maximum overflow during proceeding monsoon with dates.	
13.	History of past distress. if any, and brief details of remedial measures carried out.	
14.	Does the Officer-in- Charge of the Operation and Maintenance of dam possess all the records as given in the Annexure-I.	
15.	When and by whom was the dam inspected immediately proceeding this inspection?	
16.	Are the items pointed out during the last inspection properly attended to? (If not state deficiencies yet to be corrected).	

PROFORMA FOR PERIODICAL INSPECTION OF DAMS**Inspection of dams and ancillary works****B. EARTH DAM**

Item	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
1.	Downstream drainage:		
	(a) Are there any signs of water logging, slushy conditions or growth of aquatic weeds on the downstream of the dam?		
	(b) Are there any standing pools of water in the downstream area of dam? If so, give their locations and extent?		
	(c) Are there any boils observed in the vicinity of the downstream toe of the dam ?		
	(d) Is the downstream area sufficiently clear and free draining?		
	(e) What is the depth of ground water table on the downstream as evident from the existing walls in the vicinity of the dam? Does the water table show any marked variation in accordance with the variations in reservoir water level?		
	(f) Are all the exposed drains working satisfactorily?		
	(g) Toe drains and cross drains:		
	(i) Are the portions of longitudinal toe drain and exposed cross drains beyond the downstream toe of the dam in regular section and freely draining?		
	(ii) Is the pitching to these drains intact?		
	(iii) Is there any weeds growth in these drains?		
	(iv) Indicate other defects noticed in these drains if any.		
	(h) Outfall drain:		
	(i) Is the outfall drain in proper shape and grade and freely draining?		
	(ii) Is the outfall drain properly cleaned and maintained?		

Item	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)

(iii) Does the outfall drain show any stagnant pools of water or weed growth?

2. Surface drainage of downstream slope

- (a) Is the condition of the downstream slope drainage arrangements satisfactory?
- (b) Is the paving to these drains intact?
- (c) Are all the drains properly maintained and free of vegetation growth and debris?
- (d) Does the slope have a tendency to develop severe rain cuts at any location?
- (e) Enumerate any other defects noticed in the surface drainage of downstream slope.

3. Seepage measurements:

- (a) Is the quantity of seepage being daily or periodically measured with respect to water level in reservoir and recorded? Please check the registers and record observations.
- (b) Does it show any abnormal rise or fall? If so does it have any relation to a certain reservoir level elevation?
- (c) Does the seepage flow show a turbid colour at any stage? Was such a phenomenon observed at any stage at any location in the past.
- (d) What is the measured rate of seepage flow with date and reservoir level.
 - (i) On the day of present inspection.
 - (ii) Maximum since last June.
 - (iii) Minimum since last June.
- (e) Is the portion upstream and downstream of measuring points of seepage easily accessible with proper steps and path and free vegetation growth?
- (f) Are the measuring points properly located, constructed and maintained so as to give accurate and reliable measurements of seepage?
- (g) Is the method of taking seepage measurements satisfactory?

Item	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	(h) What is design seepage discharge? State your observation on comparison.		
4.	Earth dam section crest		
	(a) Is the crest profile at proper elevation? Does it show any signs of excessive and/or uneven settlement? If so, indicate such locations and extent of settlement (surface settlement points must be installed for observing this aspect).		
	(b) Is the surface of the crest free from undulations and local depressions or heaving? Does it provide an all weather road surface?		
	(c) Does it develop any visible cracks in transverse or longitudinal directions? If so, attach a map showing their locations and extent. Depth and width of cracks must be ascertained by taking open trenches extending below the bottom of cracks.		
	(d) What is the condition of the edges of crest? Is ramp provided? Any road crossing provided? Have they got eroded and cut up resulting in reduced effective width?		
	(e) Is the crest free from local slips throughout its length on either sides?		
	(f) Do the headers, guard stones and parapet wall provided at the edges of the crest appear in proper profile and plumb?		
5.	Earth dam section-Upstream and downstream slopes.		
	Indicate the general conditions of upstream pitching, downstream pitching/turfing and rock toe.		
	(a) Do the upstream and downstream slopes show any sign of bulging or concavity? If so, indicate their locations and extent.		
	(b) Does the section of the dam and both the slopes appear structurally sound and stable?		
	(c) Are any longitudinal or transverse cracks noticed in any part of the slopes?		
	(d) Were any signs of distress to stability of		

Item	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	slopes noticed at any time in any part of the dam? If so, give brief details of the incidents and location, the method of treatment adopted and its effectiveness. Indicate the general conditions of upstream pitching, downstream pitching/turfing and the rock toe. (e) Is there any profuse growth of bushes or weeds over any portion of the dam? If so, indicate the locations. (f) Do the upstream or downstream slopes show existence of crab holes or holes made by rodents or burrowing animals or anthills? If so, indicate the locations. (g) Are there any wet or slushy patches and concentrated leaks springs or trickles observed on the downstream slopes or the toe? If so, indicate their locations and extent. Please look out for patches of extensive vegetation growth and examine there carefully and record your findings. (h) Are all the rain cuts and erosion channels properly treated and made good? Please indicate location of recurring damage, if any.		
6.	Junction earth work with Masonry/Concrete dam sections and outlets.		
	(a) Is there any existence of leaks springs or wet spots in the earth work in the vicinity of the junctions between earth work and masonry works? If so, what is the approximate rate and colour of the leakage? Does it turn turbid at any time? Please ascertain from enquiries and record the findings. (b) Is there any tendency for separations cracking settlement or upheaval of the earth work in the vicinity of masonry on concrete? If so, indicate the locations and the exact nature of deficiency. (c) Is there any tendency for surface erosion the junctions?		

Item	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)

- (d) If the outlet conduit is located in the earth dam sections is the entire length of the conduit in perfect order and profile and free from of offsets, open joints, cracks and leakage. Examine the condition carefully from the downstream or from inside if possible and indicate the decencies observed if any.
- (e) Crack the condition of the crest and slope specially in the zones adjacent concrete structures. Detect the deformations, settlements, cracks or other distress, conditions caused by external erosion due to wind, rain etc. Set up permanent observation system for the same at the places of occurrence. Seepage at junctions between earth dam and masonry concrete retaining wall or corch type junctions with concrete dam is a possible source of trouble and should be carefully watched.

7. Relief Wells

- (a) Are the relief wells in good working conditions and functioning well?
- (b) Are the relief wells properly cleaned periodically?
- (c) Please indicate the date of last cleaning and the next cleaning due.
- (d) Are the necessary plant and equipment for cleaning the relief wells, available with the office?

8. Breaching Section (if provided)

- (a) Is the breaching section easily accessible?
- (b) Is the condition of the breaching section satisfactory?
- (c) Is the note of instructions as to when and how to operate the breaching section available on record?
- (d) For reconstruction after the breach are the

Item	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	following items decided in advance?		
	(i) Quarry for embankment material.		
	(ii) Suitable routes of access.		
	(iii) Agency, plant and machinery for its reconstruction.		
	(e) Is the maintenance staff fully aware of the instructions at (c) and (d) above.		
	(f) Ascertain and indicate the latest event of operation of breaching section and its performance.		
	(g) Is the surplus coarse from the breaching section acquired up to natural valley?		
	(h) Is the course formed?		
	(i) Is the surplus course assigned later as agriculture land or house site?		
	(j) If so what steps are taken?		

Note:- For items pertaining to spillway, Gates, Sluices and outlets etc. Please refer points 4, 5, 6, 7, 8, 9, 11, 12, 13, 14 under Masonry/Concrete Dams.

PROFORMA FOR PERIODICAL INSPECTION OF DAMS**Inspection of dams and ancillary works****C. MASONRY/CONCRETE DAM**

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
1.	Upstream and Downstream faces		
	(a) Examine the monolith and construction joints for such defects as cracks, open joints, spalling, seepage leaching etc. and indicate the findings.		
	(b) Is the upstream face of the dam in good condition? If not, indicate the nature and extent of deficiency.		
	(c) Is any spalling or cracking observed on the downstream face specially near the zone of concentration of stresses like the toe or location of abrupt change in geometry, or at the openings? If so, indicate the details of observations.		
	(d) (1) Is there excessive seepage/sweating at any location on the downstream face of the dam?		
	(2) Whether the observation are analysed and compared with the theoretical assumptions made in the design?		
	(3) Remedial measures in case of large variations.		
	(e) Examine the roadway/top of the dam for offsets, opening of construction joints, conditions of parapet wall; drainage, lighting etc.		
2.	Dainage Gallery		
	(a) General		
	(i) Is the drainage gallery casily accessible and does it have adequate lighting facilities with sufficient stand by units of lighting? If not, indicate the dificiencies.		
	(ii) Are proper arrangements made for the measurement of seepage into the gallery? Is the seepage from-		
	(a) Porous pipes		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	(b) Foundation drains (c) Monolith joints (d) Other seepage locations measured separately. (iii) Are the above arrangements satisfactory?		
	(b) Seepages from foundation (i) Has there been a substantial reduction in the seepage through the foundation, is it due to chocking of the drain holes? (ii) Are all the foundation holes periodically cleaned? Indicate the last date of such cleaning and extent of variation observed in the seepage discharge before and after the cleaning. (iii) Are measurements of uplift pressures taken regularly? What was the uplift like at heighest reservoir level during last season? Is observed uplift within design limits? (iv) Are the seepage water and the deposit if any from the seepage being regularly examined for chemical composition ? If so, indicate the results and the probable source of dissolved salts if any. (v) Are any seepage water springs observed in the downstream area any where : If so, indicate the locations and state the physical nature of this seepage. Look out for such seepage spots particularly near the dykes fault zone etc. Ascertain if chemical tests are made of water samples from such springs for dissolved salts.		
	(c) Seepage from body wall (Dam and Spillway) (i) What is the total seepage into gallery from the porous pipes in the dam at lake full condition. How does it compare with the seepage (for the corresponding water level) when the reservoir was first filled ?		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	(ii) If there has been a substantial reduction in this seepage ascertain and indicate the probable reasons therefor.		
	(iii) Is a statement showing the surface area of the dam (water side) calculated block wise for each meter of rise of water level available ?		
	(iv) What was the total seepage per square meter of upstream face submerged during inspection ?		
	(v) Is there any excessive seepage from any, body drain or any other location in the gallery.		
	(vi) What steps are being taken for regular periodical cleaning of the porous pipes.		
	(vii) Has there been a tendency for gradual reduction of drainage through pipes and progressive appearance of sweating on the downstream face of the dam ?		
	(viii) Has there been considerable leaching from the seepage water and deposition of lime near the seepage exit spots ?		
	(ix) Are the sample of the seepage water and the reservoir water being regularly tested for reactive and corrosive properties ?		
	(x) Has the total leaching been estimated ?		
	(xi) Is the seepage on the downstream face of the dam measured ?		
	What was the seepage on the date of inspection ? What was the maximum seepage during the past one year ?		

3. Structural performance

(a) Are there any signs of structural distress noticed in dam spillway and foundations in the form of :-

- (i) Excessive deflection .
- (ii) Tendency of gradual sliding.
- (iii) Cracking and upheaval of settlement in any part of the body wall

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)

or foundations.

(iv) Excessive uplift

(v) Excessive seepage and leaching through the body of the dam and the foundation.

(vi) Conspicuous weathering of materials or components in any portion of the body wall or the foundations.

4. Spillway Gates : - Spillway gates and other gates wherever applicable.

- (a) Are the following documents available at site ?
 - (i) A complete set of detailed design calculations together with the drawings of gates, gate grooves embedded parts, hoisting mechanism and controls etc.
 - (ii) Designers operating criteria and/or detailed operating instructions for the various types of gates installed in the dam.
 - (iii) Maintenance schedule specifying each operation its frequency, any for due and done dates.
 - (iv) Operating instrumentation with "Dos and Dents" for all operational units.
- (b) Is the condition of the steel surfaces and the surface paint deteriorated ?
- (c) Are any connecting bolts of rubber seals loosened or damaged ? If so, indicate the details of defects.
- (d) What is the general condition of rubber seals ?
Do any of the rubber seals show signs of weathering, hardening, cracking or tearing and damage ?
- (e) Are the rubber seals of side and bottom touching all along the sealing surface ?
- (f) Do the rollers (wherever applicable) touch the track plates uniformly ?

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	Are the rollers well lubricated ?		
	(g) Are the electrical motors, gear systems, limit switches, brakes, bush bearing etc. of hoist mechanism well lubricated.		
	(h) Is the operation of the above, smooth and satisfactory ? If not, list out individual results and observations.		
	(i) Are the embedded parts of spillway gates, emergency gates, and stop logs in sound condition and free from corrosion, uneven wear, cracking chipping and dents ?		
	If not, state the nature of defects or deficiencies and observation if any regarding such defects.		
	(j) Check the following for structural soundness of all members and welded, bolts and riveted connections, uneven wear, uneven bearing, cracking, chipping and dents and indicate the findings :-		
	(i) Gate leaf and stiffeners.		
	(ii) End arms.		
	(iii) Trunnion girders.		
	(iv) Stop logs.		
	(v) Lifting beams.		
	(vi) Gantry cranes.		
	(vii) Tracks.		
	(viii) Bridge structures.		
	(k) Are the trunnion bearing of radial gates property lubricated ?		
	(l) Is there any damage or weathering caused to the seal plates ?		
	If so, indicate the nature of damage noticed.		
	(m) Is the full length of wire rope of the hoist in sound condition and free from broken strands ?		
	(n) Is the electrical wiring in sound condition ?		
	(o) Is the alternate power system for gate operation working properly ?		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	Give details of generating sets and stand by units and the time required to operate all gates on the alternative power system, on the basis of actual trial operation. Check for diesel stock for operation of generator, battery charger available. Battery in spare. (p) Is the operation, which is stand by in case of electrical hoists, tried and found satisfactory ? Please take test trial and ascertain. (q) Are all the nuts of connecting bolts and anchorages properly tightened ? In case of trunnion girder anchorages tightening torque which is generally specified should be adhered to. (Note- After inspection of the various items it is necessary to draw up a list of actions needed to be taken and pursue matters with the concerned agency). (r) Are the hydraulic hoists working satisfactory. (s) Are the trunnions hub and the brackets well maintained ? (t) Are the trunnions likely to get submerged during actual working of the spillway ? If so, ascertain the causes for the same and specify. Please enquire for occurrence of such events if any. (u) Are any of the mechanical or structural components and fasteners or seals subjected to excessive wear ? If so, please give details. Is there any tendency for recurring damage to any particular components ? If so, please give details. (v) Is sufficient stock of spare which need frequent replacement maintained at the site ? (w) Is the staff posted at the site, maintenance and operation of gates, hoists, equipments and electrical installation ; well experienced, fully trained and conversant with the job		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	requirements and responsibilities ?		
	(x) What is the exercising frequency ? When were the gates last exercised ?		
	(y) Performance during inspection.		
	(z) Change over switches for main power supply to generator supply are provided ?		
5.	Spillway bridge, hoist bridge catwalks, and other bridges where applicable.		
	(a) Are the decking, girders and structural support of spillway bridge, hoist bridge and catwalks structurally sound.		
	(b) Is the floor of the bridge structurally sound and safe ?		
	(c) Is there satisfactory arrangements to prevent unauthorised entry into the control structures and bridges ?		
	(d) Are the structural members and joints sound and free from corrosion ?		
	(e) When were the steel components painted last ?		
	(f) Is the surface of steel work and paint satisfactory ?		
	(g) Is the parapet or railing over the bridges sound and safe ?		
	(h) Are all the bearings, bearing pads and pier caps structurally sound ?		
	(i) Are all the track plates for gantry cranes laid over such bridges structurally sound and intact ?		
6.	Energy dissipation arrangements.		
	(a) Can the tail pond be drained easily for inspection of the stilling basin ? If not what are the short comings ? Please ascertain and indicate the last event of inspection of stilling basin.		
	(b) From the examination of the levels and contour plans and reference marks in tail channel ; ascertain if there is progressive erosion and retrogression in the tail channel ?		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	If so, indicate the extent and location of such erosion with reference to the various components of dams, spillway outlet, power house etc. (c) Is the concrete surface of the stilling basin and apron in good condition ? Are there any indication of pitting cracking, spalling or wearing of the surface of bedding concrete ? If so, please give details of the nature and extent of the damage. (d) Is there any indication of abrasion and cavitations damage (pitting of concrete) especially at friction block, chute brocks the surface near the lower tangent point and the end still ? If so, please give the details of nature and extent of the damage. (e) Is the under-drainages of the stilling basin satisfactory ? Are all the open drain holes clear and functioning well ?		
7.	Walls		
	Guide walls/Divide Walls, Junction Wall/Return Walls/Spray Walls etc. (Strike out whichever is not applicable). (a) Are all the location of such wall accessible for inspection, maintenance and repairs ? (b) Is the drainage of back sides of the walls (wherever applicable) from the weep holes satisfactory ? If not indicate the nature of deficiencies. (c) Is there any tendency for the water to under cut the ends of the walls ? If so, please give details of nature and extent of damage. (d) Is there any foundation erosion or scour noticed in the vicinity of such walls ?		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	If so, give the details of nature and extent of such damage. (e) Is there any surface erosion/damage caused, to face or body of such walls ? (f) Do any of the walls show symptoms of unequal settlement development of cracks and tilting ? If so, give details of the defects, noticed. (g) Is there any damage to guide bands. If so, give details of the damage.		
8.	End Weir		
	(i) Is it accessible ? (ii) Is there any erosion pitting or spalling of the surface near the lower tangent point. If, so give details. (iv) Is there any scour noticed on the immediate downstream of such weir ? If so, give details of location and extent of such damage.		
9.	Hydraulic performance of Energy-dissipation arrangements.		
	(a) Do the flow conditions in the stilling basin have a tendency to draw rocky material into the bucket and cause its churning and abrasion damage to the surface of bucket, baffle blocks, apron and end still ? (b) Is the hydraulic performance in proper agreement with the results of model studies ? Ascertain the performance from observed tail water rating curves and deficient observation if any such as weep outs and location of secondary rollers and retrogression.		
10.	Instruments installed and observations		
	(a) Are all the instruments installed properly accessible ? Are all the locations properly lighted ventilated and adequately protected form		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	possibilities of damage ?		
	(b) Are all the instruments in proper working order ? Ascertain the cases of instruments going out of order and indicate.		
	(c) Are all the registers of observations posted up to date ? Please test observations and initial the registers.		
	(d) Are all the plottings of the instruments data completed upto date ?		
	(e) Are sufficient stocks of spares, gauges, master gauges, stationery items etc. maintained at the site for uninterrupted data collection ?		
11.	Outlet		
	(a) Is the air vent periodically cleaned ?		
	(b) Are there any structural damage to the intake wells ? Such as leakage noticed through wells ?		
	(c) Is there any leakage observed through the conduit, concrete or masonry ? If so give details of its location and extent.		
	(d) Is there any damage noticed to the conduit concrete, breast wall and gate slots ?		
	(e) Is the bye pass valve (wherever provided) operating satisfactorily ?		
	(f) Take operating trials of the following as provided and record the observation and defects noticed if any.		
	(i) Service-gate/s		
	(ii) Emergency-gate/s		
	(iii) Stop-log-gate/s		
	(iv) Sluice-valves.		
	(g) Are the trash racks (wherever provided) cleaned before monsoon ?		
	(h) Are there vibration and noise noticed in operation of outlet gates at any time ?		
	If so, are any periodical observation taken to ascertain their severity ?		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)

- (i) Is the energy dissipation arrangement working satisfactory for all discharges ?
- (j) Is there any structural damage, to the energy dissipation structures ? If so, give the details of nature and extent of damage.
- (k) Is the conduit structurally sound and reasonably leak proof ?
If not, give details of natures and extent of the effects.
Is it possible to examine the conduit from inside ?
- (l) Is there any seepage noticed around the conduit as ascertained from the observations of the downstream conditions ? If so, is it likely to cause (in case of earth dams) erosion and piping ?

12. Outlet gates

- (a) Is the surface of gates and the paint deteriorated ?
- (b) Are the connecting bolts of rubber seals loosened or damaged ?
- (c) Do the rubber seals show signs of weathering and damage and need replacement ?
- (d) Are the rubber seals of sides and bottom touching the bearing surface uniformly ?
- (e) Do all the rollers touch the track plates ?
- (f) Are the rollers well lubricated ?
- (g) Is the operation of outlet gates smooth ?
- (h) Are the stem rods for lifting the gates straight ?
- (i) Are the actual operation of lifting and lowering of the gates and hoist mechanisms smooth and satisfactory ?
- (j) Are all the gears and hoist mechanisms well lubricated ?
- (k) Is the storing arrangement for emergency gate leaves and the stop logs in satisfactory condition ?

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	(l) Are the seal plates in sound condition ? If not ascertain the type of damage and indicate.		
	(m) Is the full length of wire rope (wherever applicable) of the hoist in serviceable condition and free from any broken strands ?		
	(n) Are all the nuts of connecting bolts and anchorage property tightened ?		
	(o) Are all the lifting beams in proper order and sound condition ? If not ascertain the nature and extent of damage and indicate.		
	(p) Do any of the mechanical or structural parts of the gates, fasteners or hoists show signs of excessive wear ? If so, please give details.		
	(q) Is there any tendency for recurring damage to any particular component or components ? If so, give details .		
	(r) Is sufficient, stock of spares which needs frequent replacement maintained at the site ?		
	(s) Whether hand cranks are kept under lock and key and not attached on hoist mechanism when operated by electrical energy ?		
	(t) Whether warning sign indicating "Danger, Do not switch on" is hung during maintenance ?		
	(u) Whether the operating crane is in 'A' condition and the operators are instructed to lift the emergency gates/stop logs in a vertical direction so that allowable carrying capacity is not exceeded ?		
	(v) Whether there is a "standby" power supply ?		
	(w) The alternative sources of power - (1) Is the generator in the working condition ? (2) Frequency of exercise. (3) Is it developing full voltage ? (4) Is the wiring in tact ? and is the change		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)

over switch in working condition.

(5) Are the spares available at site ?

13. River outlet/River sluice & Gates

- (a) Is the over all condition of river outlet works/river sluices satisfactory ?
- (b) Is the operation of the gate satisfactory as ascertained by taking an operating trial ? If not, indicate the defects noticed.
- (c) Are the trash rack (wherever provided) cleaned before monsoon ?
- (d) Is there excessive silting on the upstream of the sluice ?
- (e) When were the gates last opened for desilting etc. ?
- (f) Please indicate the approximate quantity of the leakage through the gates, if any.
- (g) Is there any seepage or leakage through the conduit surface ?
- (h) Is there any damage to the upstream sand downstream conveyance structures of the conduit ?
- (i) Is the condition of energy dissipation arrangement satisfactory ?
- (j) Is there any retrogression noticed in the downstream channel ?
If so, give details of nature and extent of damage.

14. Power Outlet

- (a) Is the overall condition of power outlet satisfactory ?
- (b) Is the operation of gates smooth and satisfactory as ascertained by taking operating trials?
If not, indicate the nature of the defects noticed.
- (c) Are the trash racks cleaned before monsoon ?
- (d) Is there excessive silting in the approach channel on the upstream of power outlet ?

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	(e) Is there any seepage through the conduit surface ?		
	(f) Is there any cavitations damage to the inside of the conduit and nonstock of the HRT and pressure shafts ?		
	(g) Are all the valves functioning properly ?		
	(h) Are there any vibrations inducted into the dam and appurtenant works while the outlet is opened or the machines are running ?		
15.	Emergency Preparedness		
	(a) Are the project officers well conversant with the Emergency Action Plan, Reporting procedures, warning procedures.		
	(b) When was the Emergency Action Plan last reviewed ?		
	(c) Are the communication directories updated ?		
	(d) Are the concerned authorities informed about the system of emergency reporting procedures and warning ?		
	(e) Are the inundation maps updated ?		
	(f) Are available safety spots on the downstream of the dam identified and made known to the concerned authorities ?		
	(g) Is the communication system working satisfactorily ?		
	(h) Are adequate warning devices and facilities provided at the dam ?		
	(i) Is the downstream warning system operational ?		
	(j) Are proper arrangements made for security of the dam and preventing cases of unauthorised trespass, vandalism and sabotage to the dam works ?		
	(k) Is downstream warning system operatable on alternative power supply ?		
16.	Access Roads		
	(a) Is there a properly constructed and well maintained all weather access road to the dam site ?		

Item No.	Item of Inspection	Observation and recommendations if any of the inspecting officer	Remarks of reviewing officer
(1)	(2)	(3)	(4)
	(b) What is the type of pavement of the access road and its condition ?		
	(c) Are there properly and well maintained access roads arrangements to the following components for inspection, maintenance and repairs ?		
	(i) Top of dam		
	(ii) Spillway		
	(iii) Gates and hoisting arrangement		
	(iv) Drainage gallery		
	(v) Bridge structure		
	(vi) Downstream stilling basin		
	(vii) Junction and abutments		
	(viii) Outlet control tower		
	(ix) Outlet gates		
	(x) Too of earth dam downstream drainage arrangements and beams.		
	(xi) All saddle dams.		
	(d) What is the general condition of all the structures on various access roads ?		
	Are all the structures on the access roads adequately safe, for allowing passage of plant machinery for emergent repairs ?		
17.	Communication facilities		
	(a) Are following facilities available at dam site ?		
	(i) Wireless		
	(ii) Telephone		
	(iii) Telegraph		
18.	General Assessment of condition of the Dam		
	Please give general assessment of safety of dam for normal operation. Please enumerate all your observations which you feel are adverse to the safety of the dam for normal operation.		

ANREXURE-I**Records required at Site**

(referred in Item 14 of General)

Records that may be required for proper inspection and maintenance shall be available at site. These shall be properly maintained and kept up-to-date by including latest information available. Data in respect to the upstream gauging station, flood warning system and communication channels, if installed, shall be properly maintained.

1. Final detailed Project Report and details of modifications done during construction and a set of final drawing (as executed).
2. Index Plan of the area in which the dam is located showing important towns, roads, rail routes and communication facilities.
3. Index plan of downstream area showing natural flood zone, flood zone corresponding to spillway design flood and dam break flood and all important towns/villages and properly lying in there flood zones.
4. Contour map of dam site extending upto 200 m or 10 times the dam height (whichever is less on upstream and downstream showing all features of the dam like toe lines, fills, drains, relief wells, access roads etc.)
5. Record drawings of longitudinal section of dam foundation of cut off trench showing details of foundation stratigraphy, stagewise construction of COT filling and raising of dam section embankment zoning details and foundation treatment.
6. Record drawings of cross-sections of dam showing details of foundation treatment, under seepage control zoning, internal and external drainage all protective arrangements and stagewise construction.
7. Contour plan of dam site with foundation trench showing details of foundation treatment and foundation drainage.
8. Contour plan of reservoir basin.
9. Contour capacity and area - capacity curve.
10. Reservoir maps showing silted basin, if observed.
11. Plan of the catchment area showing rain gauge stations, and capacities of upstream storage's
12. Material properties adopted for design.
13. Details of design criteria followed.
14. Design report on flood studies and spillway design flood.
15. Design reports of outlets, power outlets, river sluices intake, conduit, energy dissipation arrangements and details of gates of hoists.
16. Geological data on the foundation and abutments.
17. Copies of geological reports, details of special foundation and abutment treatment carried out.
18. Record of tail channel geology and tail channel erosion.
19. Instrumentation drawings with details.
20. Instrumentation data and behavioral record.
21. Details of communication system telephones, wireless etc. directory of important key officers, flood warning procedures.
22. Flood forecasting system.
23. Photographs. showing various phases of construction. pre- construction etc.

Earth- Rockville Dams

1. Stagewise construction record of the dam showing volumes and heights achieved in each season and time fate of progress.
2. Record of special compaction done near concrete/ masonry structures, abutment contracts and outlet locations, if available.
3. Summarised records of compaction control, sampling and complete laboratory and field test results on all recorded samples.
4. Foundation details and geology as observed.
5. Data of water intake test.
6. Detailed drawings and record of relief well observations.
7. Design report for the earth dam, covering the under seepage control, stability of embankments junctions with masonry dam, instruments installed etc.
8. Drawings showing the earth typical cross sections, including zoning, drainage arrangements, detailed details of slope protections, provided for etc. as per actual construction.
9. Details and location of instruments embedded/installed in and around the structures.
10. Record of corrective measures, repairs and treatment that have been done subsequent to construction.
11. Details of design criteria followed.
12. Photographs showing all phases of construction.
13. Important inspection reports and reports of consultants.

Concrete / Masonry Dams

1. Details of construction history stages of construction particularly in low blocks where considerable time elapsed prior to resumption of work.
2. Summarized data on control tests, carried out during construction in respect of concrete, mortar and their constraint materials, if available.
3. Reports on hydraulic model studies.
4. Drawings showing the details of energy dissipation arrangements, including foundation levels of apron, training walls and end weir.
5. Details and location of instruments embedded/ installed in and around the structure.
6. Summarised data of observation on embedded installed instruments.
7. Detailed showing of all service facilities like internal lighting, emergency lightining, drainage etc.
8. Drawing showing the uplift measurements and pressure relief arrangements.
9. Summarized data of uplift pressure observed.
10. Summarized dam of seepage's, leaching observed in the drainage gallery and downstream face of the dam, their locations etc.
11. Record of corrective measures, repair or treatment that have been done subsequent to completion.
12. Important inspection reports and reports of consultants.
13. Details of design criteria followed.
14. Photographs showing all phases of construction.

Operation and Maintenance

1. Gauge data of the river prior to the construction and after completion of work.
2. Detailed observation of flood discharges.
3. Detailed observations of hydraulic performance of energy dissipation basins.
4. Record of past performance stating briefly the defects developed and remedial measures carried out.
5. Drawing of outlets, maximum discharge capacity, maximum design operating head.
6. Standing orders regarding operation of the dam -
 - (a) Designers operating criteria.
 - (b) Standing operating procedures
 - (c) Flood forecasting procedures
 - (d) Gate operation procedures.
 - (e) Emergency action plan.
7. Standard reference literature for operation and maintenance of reservoir, dam, ancillary work, gates, instrumentation etc. including I.S. specifications, codes, manuals, manufacturers / literature etc.

(B) CANAL SYSTEM**Proforma for Annual Inspection Report of the Canals of Project for the year**

Category : Annual/Once in 4 years.

Name of Inspecting

(*Delete item not available)

Officer with date

(Note : Increase of once in 4 years

Date of last inspection

Inspection, give date of last

Inspection with name of Inspection

Officer.)

1. Name of Project:

2. Particulars of canals:

LinedUnlinedLength not operated
during the year.Total

- Kilometer of Chains-

a) Carrying above 30
cumecs.b) Between 10 to 30
cumecs.c) Between 3 to 10
cumecs.

d) Below 3 cumecs.

Total:

3. Category of canals inspected

(a, b, c or d)

4. Details of Canals under Report:

Name of canal	Total Length	Designed Discharge	Reach inspected (if in part)	No. of Structures
		Head	Tail	Total inspected
1	2	3	4	5

1
to
10 (or as
necessary)

5. Incumbency of officers in charge of O & M: (Give incumbency necessary for the category of canals under report i.e. for (a) SDO to C.E. & (b) SDO to SE & (c) to (e) SDO & EE)

Name & Period			
S.D.O.	E.E.	S.E.	C.E.
1	2	3	4

**6. Remarks
of inspecting
Officers:**

S. No.	Particulars	Remarks of Inspecting Officer	Observations of next higher authority. (except in case of C.E.)
1	2	3	4

(1) Completion Reports & other

Drawings:

- Are the required completion drawings & other reports available with the Sub-Engineer\SDO\EE.
- If not what are the records missing; and who are the officials not having it ?
- What action if any is taken to make good deficiencies pointed in this behalf in the last report.

(Note: Attach a separate note highlighting these aspects.)

(2) Canal Earth Work/Lining:

- State the general condition of Canal Earth work with reference to;
 - Outer slopes (any excessive depressions/vegetation growth.)
 - Catch water drains.
 - Spoil Banks (causing any inconvenience).
 - Top of Bank (both service & non service side).
 - Dowla

- (f) Service Road.
- (g) Inner slopes & Bed.
- (h) Bed stones, chainage stones & boundary stones.
- 2. State the general condition of lining (Identifying reaches having developed undue cracks, pitching, subsidence etc. if any).
- 3. Are any reaches reported to be carrying less discharge, if so reaches & discharge being carried. Has the SDO taken cross sections? Does these indicate necessity of remodeling. If so, what should be its priority.
- 4. Were any such reaches highlighted in the previous inspection report. If so with what results.

(3) Canal Structures:

- (a) What is the general condition ?
- (b) Are any wild growths existing ?
- (c) Are the wheel Guards/Railing etc. properly maintained & white washed/painted.
- (d) What is the general condition of area d/s of canal structures.
- (e) Are the ramps for bridges properly maintained .
- (f) Are the junctions of earth work with masonry structures properly maintained.
- (g) Is the grouted pitching/lining, provided at these places, is in good condition.
- (h) (1) Are the gates, lifting, gears etc (if any) provided at these structures in good condition ?
- (2) Have these been inspected by E/M staff as per Rules, if so when ?
- (3) Have these been properly oiled & greased.
- (i) Number of Aqueducts along these canals. Have they been all carefully inspected & found in good condition.
- (j) No of C.D. work along these canals and whether these are functioning well.

4. Damage by seepage through canal:

- 1. Are any areas close to the canal or elsewhere found marshy, affected by excessive seepage. If so give details.
- 2. What are the probable cause for this excessive seepage, and how these should be dealt with (i.e. through drainage system or

lining of canal etc.)

5. Irrigation Practices:

1. Are Irrigation panchyats properly constituted for the area COMMANDED by the canal. If not why? (give details separately)
2. Whether Osrabandi & Warabandi, both are being practised, or only osrabandi. Reasons for non-practicising of both., detailing efforts made in this behalf .(attach separate note)
3. What is the shortfall from designed irrigation. Narrate the steps taken/necessary to accomplish designed irrigation.
4. How is the position of recovery of water rates. State the specific causes for non-recovery of current dues/Arears in a separate note.
5.
 - a) What is the system of Annual repairs adopted, whether through gangs/casual employment of labour, piece work or contracts.
 - b) Is the programme of repairs approved by SDO/EE in advance (not to be mixed with A/R Estimates.)
 - c) What is the maintenance expenditure.
 - i) For this reach of the canal
 - ii) Total per ha of area irrigated, by this reach of the canal & by the project.
 - d) Give details of special repairs if any carried out since last report.

(6) Miscellaneous Items:

1. Are any measuring device provided in the canal system? if not, whether canal discharge is otherwise being checked periodically by Sub-Engr./SDO/EE, if so give details in a separate sheet.
2. What are the Rain gauges operating in the area. Have the rainfall records been regularly forwarded to authorities.
3. What are the building colonies situated in the area (name areas & location for the isolated buildings). What is the general condition of these.

4. Are Sub-Engineers maintaining prescribed expenditure register if not, action taken for its upkeep hereafter.
5. Is the Project discussed in the meetings of Divisional/ Distt. Water Utilisation Committee. Highlight briefly matters concerning this project.

Date:

Place :

**Signature
of
Inspecting
Officer**

**Signature of
Observing Officer**