

DEPARTMENTAL CIRCULAR NO. 42 OF 1978

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My No: WG/10/85

Irrigation Department,

Colombo 07.

13th September 1978

III

CITEE/LEE

ATTENTION TO IRRIGATION SCHEMES DURING NORTH EAST MONSOON:

1. GENERAL

1.1 Scope of Circular:

Recent departmental documents such as 'flood preventive Measure to irrigation Works Safety Measure during Flood etc. and the old Standing Orders on the subject of floods contain in each document some of the aspects dealt with in this Departmental Circular No 42 of 1978. This circular is prepared to set out as comprehensively as possible and contain in one document the full scope of attention required for irrigation schemes during the North-East Monsoon season which is the period of greatest threat to the safety of the works constructed for these schemes.

This circular does not supercede the existing documents referred above. If any aspect that has not been dealt with in this circular appears in any of the existing documents, then clarification should be obtained from the appropriate member of the Directorate in Head Office before acting on same. If this circular and existing documents are in conflict on any matter relevant to the title of Circular, then this circular should prevail.

1.2 Personal Attention:

The need for personal attention to the care of Irrigation Schemes during the period they are subject to the greatest threat from forces of nature cannot be disputed. Hence Engineers, Technical Assistants and other field staff entrusted with the care of the Irrigation Schemes, as well as certain categories of supporting staff such as Store Keepers, Draughtsman etc., including Drivers of vehicles and Workman engaged on maintenance work should not take leave or be on unauthorized absence from work, except in the case of illness, during the period 15th November through to 31st January. Prompt action should be taken by the IE in charge of the division to provide substitute arrangement for unauthorized absence of key personal and report such circumstances to higher authorities for appropriate action against the absent staff member. There is no objection to the granting of not more than 2 days

leave provided the total period of absence from station does not exceed 4 days, if in opinion of the I.E., a normal North East Monsoon is being experienced in the Scheme. Minimum leave may be granted for reasons other than illness if the circumstances considered extremely urgent.

2. STANDING ORDER FOR MAJOR SCHEMES

2.1 Preparation of standing order in Parts:

A Major Schemes is one, which irrigates 200 acres and more of farm lands. A standing order will be prepared for each Major Scheme in two parts by the IE in charge of the Division in which the Schemes located as per details below. One part designated, for example, "PART 'A' STANDING ORDER FOR HURULWEWA SCHEME- PERMANENT FEATURES" will describe the details as in Para 3 of 'Selected data of Scheme' and 'Procedures and Action' which will be applicable at all times for the schemes. The other part designated, for example, "PART 'B' STANDING ORDER FOR HURULWEWA SCHEME- FEATURES FOR NORTH EAST MONSOON 1978-79" will describe the details as in Para 4 of "Division of Scheme Sections", "Operating Staff", "Transport", "Communications", "Construction Materials", "Construction Equipment", which will be applicable for the North East Monsoon period under consideration.

2.2 Date of Preparation and Approval of Part A Standing Order:

With respect to Schemes under maintenance at present, the IE in-Charge of the Division in which the Schemes will prepare Part A of the SO within one month of issue of this circular. For new Scheme the I.E, I/C of construction will prepare same within one month of first work issue.

The Range RDI/CRE will check and approve Part A of the SO within one month of submission by their respective I.EE, and furnished approved copies to the Head Office for record and comment, if any by appropriate member of Directorate. In the case of a new Scheme, the C.R.E, I/C of construction will furnish an approved copy of Part A of the SO to the RDI of the Range in which the Scheme is situated.

2.3 Date of Preparation and Approval of Part B Standing Order:

Part B of the SO will be prepared by the I.E, I/C of the Division or the I.E, I/C of construction during the 1st half of August in each year and submitted for approval of the RDI of Range or CRE, I/C of construction on or before 15th August. The RDI or CRE will check and approve Part B of the SO on or before 1st September and furnish an approved copy to the Head Office for action as in Para 2.2. If Part B of SO is approved by CRE in-charge of construction then the RDI will furnish an approved copy to RDI of the Range in which the Scheme is situated.

2.4 Contents of Standing Order:

The SO should consist of the basic requirement described in Para 3 and 4 below. However the descriptions refer to the civil works and features in an average Irrigation Scheme. Hence the descriptions in the SO should not be limited as in this circular but should include the civil works and features as applicable to each scheme.

3. DETAILS OF 'PART' A OF STANDING ORDER

Part A of the SO prepared as per details below will indicate the permanent features of the SO. However, the I.E I/C of the Division will be responsible to prepare and submit serially numbered Addenda whenever any changes take place to enable Part A to be maintained in an up-to date position. Part A of the SO is to be made up of the following paragraphs numbered in same sequence limiting the details to those applicable for the Scheme under consideration.

3.1 Selected Data of Scheme

3.1.1 Headwork's

3.1.1.1 Reservoir Embankment: BTL; FSL; BTW; S/S; Length; Nature; Elevation and Length of U/S slope protection; Location and description of monitoring devices.

Or

Diversion weir/ Anicut: Crest Level; Abutment Level; Design/ Observed HFL; Length; Gates-Location, type, No and Size and Sill Level; Planked Bays-Location, No and Size of opening, single or double row and Sill Level; Flank bunds-BTL; BTW; S/S; Length.

Or

Pumping Station: Pump Sets-No, Make, Capacity, Horse Power; Design/ Observed HFL at Pump House; Elevation of Prime Mover to axis of drive shaft for fuel Engine and bottom of windings for electric motor; if above elevation is Below HFL and equipment does not operate under submersible conditions, describe arrangements for safety of equipment.

3.1.1.2 Reservoir Spill: Crest Level (FSL); Design/ Observed HFL; Length; Gates-Location, Type, No and Size and Sill Level, planked bays-Location, No and size of opening, Single or double row and Sill Level.

- 3.1.1.3 Emergency Spill: Also describe as Breaching Section and is generally located along the axis of the embankment-Location Length BTL/ Crest Level; BTW; S/S; width and depth of Crest wall.
- 3.1.1.4 Approach Canal to Spill: Also applicable to Emergency Spill-BL at spill; Gradient, if any; BW; S/S Length.
- 3.1.1.5 Spill Tail Canal: Also applicable to Emergency Spill and in respect of the designed and Natural portions of the spill tail canal-BL at spill; Gradient; BW; S/S; Length; Distance from spill to main drainage stream.
- 3.1.1.6 Irrigation Sluices: For each sluice-Location; Type, No and size and sill level; of control/ Bulkhead gates; D/S sill level (zero of canal); discharges with full gate opening at FSL and HFL.

3.1.2 Irrigation System

- 3.1.2.1 Main and Branch Canals: For each reach between regulations for each canal-BW; S/S of BTW; S/S of embankment; FSD; FSQ; FB; Length.
- 3.1.2.2 Canal Regulators: For each Regulator-Location; Gates-Type, No; Size and Sill level; for planked bays- No and Size of opening, single or double row, Sill Level.
- 3.1.2.3 Canal Spills: For each Canal Spill-Crest Level; Length; Design Afflux; No and Size of Vents (if any).
- 3.1.2.4 Canal Spill Stream: Same as in Para 3.1.1.5

3.2 Procedures and Actions :

Items from those listed below that are appropriate for the scheme under consideration are to be selected for the preparation of the SO.

3.2.1 Conditions at beginning of NE Monsoon Season

The officer I/C of the section (vide Para 4) will inspect the works in the 1st half of September and ensure that the conditions in para 3.2.1.1 to 3.2.1.15 prevail in his section by 1st October. The I.E I/C of the Division will provide for this purpose any additional facilities required by the sectional officer after satisfying himself of such need. The sectional officer will furnish a Report on or before 1st October on above to the IE who will furnish a copy of same with his endorsement to the RDI of the Range.

- 4.2.1.1 All embankments, emergency spills, approach canals to reservoir spills, tail canals and reservoir and irrigation canal spill, flank bunds of diversion weirs/ anicuts and similar works are free of weed and unwanted vegetative growth, fallen trees, dead trees and similar matter.
- 4.2.1.2 All crests of spill and diversion weirs/anicuts, immediate U/S approach to gates, waterways of regulators etc., are not obstructed by dead trees and floating debris likely to impair their proper functioning.
- 4.2.1.3 The waterways of all irrigation canal spills and canals of drainage schemes are free of weeds and large concentrations of water hyacinth and salvinia.
- 4.2.1.4 All embankments are free of cracks, slips and excessive runnels, scours and that large scours in embankment and canals are protected with riprap and masonry construction.
- 4.2.1.5 All toe-filters and toe drains are in proper order for efficient functioning.
- 4.2.1.6 All seepage points in embankments are treated with properly designed filters and toe drains.
- 4.2.1.7 All damaged and/or deteriorated portions of masonry construction have been efficiently repaired.
- 4.2.1.8 Critical operating parts in gates and hoists that have rusted are either repaired or replaced.
- 4.2.1.9 All damaged and /or deteriorated rubber seals of radial and fixed wheel gates are either repaired or replaced.
- 4.2.1.10 All anchor bolts and other bolts securing components together in gates and hoists are secured.
- 4.2.1.11 All moving parts of gates and hoists requiring lubrication are efficiently lubricated with appropriate lubricant and wire ropes of radial gates are coated with heavy grease.
- 4.2.1.12 All gates and hoist are checked for their operating characteristics and found to perform as required.
- 4.2.1.13 Planks are removed from planked bays in structures where such removal is required at the beginning of the NE Monsoon season and properly stored.
- 4.2.1.14 Scour gates in diversion weirs/ anicuts are opened where such opening is required at the beginning of the NE Monsoon season.

3.2.1.15 All store and construction materials at sites likely to be damaged by floods are removed for temporary storage at other location.

3.2.2 Procedures during the NE Monsoon Season

From the time a rise in reservoir level is observed and when the spilling commence in diversion weirs/ anicuts the officer I/C of the section will commence and continue reporting such occurrence to the I.E I/C of the Division. From then onwards the I.E will report the daily Reservoir Elevation, Storage and Release and the daily spilling and Release for Diversion weir/Anicut to the RDI/CIE of the Range and the Chief D.O. in Head Office by name. The I.E should ensure that the above records for the day are posted or delivered from his office not later than the following day. The Draughtsman assigned the maintenance of the above performance records (Vide Para 4) should be in readiness to answer telephone inquiries in connection with above in the absence of the I.E. The rendition of the records to the RDI/CIE and C.D.O.A may cease when the depleting reservoir reaches $\frac{3}{4}$ capacity and in the case of the diversions weirs/ anicut when the reducing spilling reaches a height of 6 inches.

3.2.2.2 The following schedule of inspection of reservoirs should be performed during the period of the NE Monsoon.

	A	B	C
	Filling up to $\frac{3}{4}$ capacity	Between $\frac{3}{4}$ & full capacity	From start of spilling
RDI	At least once	At least once	Weekly
IE in charge of Division	At least 4 times	Weekly	Twice a week
Section Officer	Weekly	Twice a week	Twice a week
Main Overseer	Twice a week	Daily	Daily

3.2.2.3 When the spilling at the diversion weir/anicut is between 2 to 3 ft, 3 to 5 ft, and over 5 ft., inspections should be performed as in Para 3.2.2.2(A), (B),(C) respectively.

3.2.2.4 The Irrigation system should be inspected for the season at least once by the RDI 5 times by the I.E, weekly by the sectional officer and twice a week by the maintenance overseer.

3.2.2.4 As far as possible the RDI should arrange a programme and notify all parties concerned do that the inspections specified in pares 3.2.2.2 to 3.2.2.4 are carried out in such manner that the works are visited at spaced regular intervals by visiting staff.

1.2.2.6 During above inspections, observation should be made to identify any-

- a) Seepage / Leaks in embankments
- b) Settlement of embankment profiles
- c) Suspicious cracks indicating beginning of slips
- d) Malfunction of toe drains
- e) Unusual build up of water table in vicinity of toe of embankment.
- f) Unusual displacement / distortion of structural members.
- g) Malfunction of any installed gauges and monitoring devices
- h) Malfunction of controlled gates by testing operation
- i) Obstructions in approach and tail canal from spills
- j) Lack of preparation with respect to transport construction materials and equipment to Handle emergencies –vide Para B.

1.2.2.7 The I.E In. Charge of the Division will be responsible to ensure that Sectional Officer and Maintenance overseer are able to identify the items described in Para 3.2.2.6. It will be the responsibility of the I.E to rectify or take appropriate steps for the rectification of the observed sources of danger to the safety of the works. He will keep the RDI informed at all time of his action and the RDI will satisfy himself of the actions taken by the I.E and offer necessary guidance and assistance.

1.2.3 Procedures for Reservoirs with gated Spills.

1.2.3.1 The operation procedure for the radial gates in services spill should be so controlled that:

- a. The release from the reservoir may not be more severe than would have occurred naturally /
- b. Reservoir storage is not lost due to flood control operation of gates and
- c. The discharge does not take place under overflow conditions at the gates.

1.2.3.2 The planned release should involve opening the radial gates to a position where the expected volume inflow in excess of outflow can be stored behind the gates up to the permitted elevation, at which gate opening and time, the inflow will equal outflow. A "Recession Curve" has to be prepared for above purpose – also vide Para 3.2.3.4

1.2.3.3. The operation of gates should be done in stage with the same amount of opening for the gates in each stage. A pair of gates should be opened / closed at a time, the amount of the opening being determined either by computation or "trial and error". Opening operations should commence with the central pair of gates and proceed to –wards the end with the next pair of gates made up from one on each side of the central pair of gates.

The above sequence should be reversed during closing operation.

3.2.3.4 If a 'Recession Curve' as in Para 3.2.3.2 has not been computed for the gates, and then adopt 'trial and error' method as following:

- a. When the reservoir elevation is 6 ins below FSL and half hourly observe steady rise in elevation' then commence operation of gates as described
- b. Open central pair of gates as 1st stage will be 1/10th of the full height of After such opening of gates observe reservoir elevation.
- c. If the reservoir elevation continues to rise according to half hourly observe next pair of half as 2nd step on 1st stage. With further rise of reservoir continue till last step of 1st stage is reached.
- d. With continuing rise in elevation of reservoir, operation "b" and "c" above repeated for other stage with an additional 1/10th gate opening for each an all gates are fully open.
- e. If the reservoir is designed for FSL and HFL to be the same, then the operation each step and each stage should be so carried out to ensure that the elevation does not rise above the FSL
- f. After all gates are fully open the half hourly observations of reservoir should be continued to determine when the recession of levels commences
- g. On observing recession of reservoir elevations at any time, closing of gates should be continued through a reverse order for opening of gates.
- h. The "trial and error" method is sensitive to human judgment and hence observation and adjustment are sine qua non for successful operation

3.2.4 Emergency Action

An emergency situation can be considered to prevail in the period when the flood increased beyond $\frac{3}{4}$ of the designed afflux and returns to the same value- also vide 3.2.4.6

3.2.4.2 The I.E, In Charge of the Division will notify the RDI and the Head Office (approved member of Directorate) when the rising flood afflux has reached of $\frac{3}{4}$ designed and declare a state of alertness amongst his staff and advise the GA of the district do likewise for the settlers under the scheme.

3.2.4.3 During the emergency period the I.E, In Charge of the Division will take personal charge of the situation and institute a round – the – clock inspection of reservoirs with rigorous observation for items listed in Para 3.2.2.6 He will keep the RDI/CIE and informed of the prevailing situation as frequently as he considers it necessary. If in his opinion a disaster is imminent, he should immediately inform the GA of the district appropriate action and also the RDI and HO and take as much action as possible to avert the disaster.

3.2.4.4 When the available emergency spill commences to function, the IE will inform the RDI/CIE who will then inspect and determine whether breaching is necessary

otherwise. If breaching is decided the RDI will promptly inform the GA and the HO and personally supervise the execution.

3.2.4.5 If emergency spill provision is not available and the afflux has exceeded the design HFL, on notification by the IE the CIE will inspect and determine whether releases are to be made from the sluices resulting in acceptable limits of damage to the canals at selected points. He should further explore the possibility of breaching the reservoir embankment within tolerable limits of damage. Having determined the above matters, he should implement one or both of them as necessary, under his personal direction, having notified the GA and HO.

3.2.4.6 An emergency situation can also prevail if there is imminent danger from causes listed in Para 3.2.2.6 while appropriate action is being taken to remedy the situation; appropriate procedures from amongst those listed above should be followed.

4 DETAILS FOR PART B STANDING ORDER

As describe in Para 2.1, Para B of SO has to be prepared for each NE Monsoon season. It is to be made up of the following paragraphs numbered in same sequence, limiting the details to the section of the scheme under consideration. Each section of scheme will have a corresponding part B of SO.

4.1 Division of scheme into sections

4.1.1 List with serial no, all section into which the Scheme has been divided for purposes of care and attention during the NE Monsoon period.

4.1.2 Identify Section of Scheme particular to Part B of SO and describe the work in the Section. The details in paras 4.2 to 4.6 should be relevant to this Section.

4.2 Operating Staff

4.2.1 Name, residential address and contact numbers of Engineer /TA I/c of section

4.2.2 Name, residential address and contact number of MO/WS/IC of section.

4.2.3 Name, residential address and contact number of SK assigned for Season for issue and indent of stores etc. for Section

4.2.4 Name, residential address and contact number of Draughtsman assigned for season responsible for office maintenance of reservoir performance records.

4.2.5 Location and strength of resident labour engaged on O&M work in section.

4.2.6 Closest location and additional resident labour available for an emergency.

4.2.7 Closest location and estimated strength of casual labour that can be recruited for an emergency during the season.

4.3 Transport

- 4.3.1 No. , type and normal parking location of transport vehicles for staff to including names , residential address and contact number of officer I/C of and their drivers. If vehicles are assigned to be shared with other section details of arrangements.
- 4.3.2 No., type and parking location of transport vehicles for stores etc., assign section, including names, residential address and contact number of officer vehicles and their drivers. If vehicles are assigned to be shared with other se give details of arrangements.

4.4 Communications

- 4.4.1 Describe normal means of communication between:
- I.E. I/C of Division and staff assigned to Section
 - I.E. I/C of Division and RDI, HO and GA.
- 4.4.2 If normal means of communications are inadequate for emergency action, describe special means that would be adopted including location and number closest available public/ private telephone that could be used in an emergency.

4.5 Construction Materials

- 4.5.1 Location and quantities of gunnies deployed strategically throughout the section emergency use.
- 4.5.2 Stock positions of reservations in main stores for use in section of cane bas concrete pans, wheel barrows, mamoties, coir string and petromax lamp etc.
- 4.5.3 Arrangements to obtain additional requirements of above stores if the need arises

4.6 Construction Equipment

- 4.6.1 Location in scheme where earth-moving equipment is being employed during season on construction work, including No. and type of equipment deployed.
- 4.6.2 Closest location outside scheme where earth moving equipment is being employ during season o n construction work, including No. and of equipment deployed.

Sgd/ A. Maheshwaran.
Director of Irrigation

Page:

Division:

Action	Reference Para in circular 42/78	Division											
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10		
Circulating the contents of this letter among field staff. (Indicates the Dates)													
Making the field staff as well as supporting staff aware on arrangement of leave.	1.2												
Preparation and submission of part B of standing orders for every scheme(Copy to be sent to CE-Dam Safety.)	2.1												
Approval by DI for S.O- Part B													
Check the availability of Part A of SO and update it (Copy to be send to CE-Dam Safety)	3.0												
When spilling commence , arrangements to collect daily reports by DIE and send to DI	3.2.2												
Inspection as scheduled by DI DIE EA WS/FA	3.2.2.2												
Inspection of section assign to, by every officer who should make an assessment of resources /data available and additional facilities required and submit a report to DIE as on para4.2,4.3,4.4,4.5,4.6, of 42/1978.	4.0												
DIE to submit a report on the division to DI													

S1, S2, indicates schemes. Please enter the name of scheme or attach a list of schemes Divisional wise.
(You may add more columns or sheets to the format to tally with the scheme in the division.)

1st Report due on 29/10/2013
2nd Report due on 01/12/2013
3rd Report due on 01/01/2014

Date

Signature
Director of Irrigation

Roster of Officers on Duty during Emergencies and their contact Details.

..... Range.

Division	Date	Name of officer	Contact number (Mobile / Land Phone)