

Public Works (1897) Department.

G.O., No. 2838 W

DATED

11th
9 Oct 1897

[Despatch Abstract.]

Shutters for the Crest of the Krishna Amicut ;
Office note from the Chief Engineer for Irrigation
in regard to the arrangements made for
the supply of —, recorded ?
=

Dr. 11-10-97

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

0
2/10/97 17/10

BACK PAPERS.

BACK PAPERS.

No.	Date.
7872	26-8-97
2265W	18-8-97

FURTHER PAPERS.

No.	Date.

E. I. Form No. 22-2,000-21-4-93.

GOVT.
OF MADRAS.

1897.

P. W.
DEPT

CHIEF ENGINEER FOR IRRIGATION.

Coty
Madras 6th Sept 1897

OFFICE NOTE No. 260

Circulation Register.

To	From	Despatch Date.	Receipt Date.
<i>W</i>	<i>E. I.</i>	<i>6.9.97</i>	

KEEP-WITH.

No. , dated 189 .

*some in press
await papers from
the Press. May*

*Para 3 of ltr. no 2265W
of 18 Aug 1897*

*Please see para
2 of ltr. no 7869 of
16 Aug 1897. in which
it was decided that
50 of the mottos for
the crest of the Kistna
Amint should be
made up at the Govt.
workshops. The material
required for these
being purchased in
India if necessary &
that the remaining*

Shutters may be obtained
on contract from
selected firms in
India.

3/5/97

W.H.
6.9.97
29

Recd
4/9/97

IRRIGATION.

Government {1897} of Madras.
PUBLIC WORKS.

Recd.

Enclosures

Regd.

1897.

Spare copies

G.O., Nos. 786, 787 I., 26th August 1897.

AUGUST.

Kistna Anicut

Forwarding copy of Proceedings requesting early sanction to the estimate of
Rs. 58,770 for fitting shutters to the crest of the —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

Read—again the following paper:—

G.O., No. 75 I., dated 20th January 1897.

Read—also the following papers:—

From Major W. L. C. BADDELEY, R.E., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezwada, 5th August 1897, No. 1320 K.N.

In reference to G.O., No. 75 I., dated 20th January 1897, I have the honour to forward complete proposals for fitting falling shutters to the crest of the Kistna anicut. The estimate is Rs. 47,200.

The following papers are forwarded:—

(i) Note by Captain Ellis, R.E., dated 4th July 1897, on various points raised in demi-official correspondence about the shutters.

(ii) Letter, No. 295 S.E. of 23rd July 1897, from the same officer forwarding—

4 Plans.	1 Data sheet.
1 D and A estimate.	1 Report.

(iii) Letter, No. 314 S.E. of 31st July 1897, from the same officer giving the results of his enquiries regarding the rates at which the shutters could be made.

2. Captain Ellis has worked out his proposals with much care, and in great detail, and the conclusions he arrives at regarding the advisability of procuring 237 shutters from Messrs. Burn & Co., and the balance, viz., 50, from the Bezwada workshops, have my strongest support.

3. The height of the Kistna anicut is at the present time insufficient for the large acreage of the system, and it is most essential that the shutters should all be fixed by next irrigation season.

4. If we rely on the Government workshops, I am certain that the shutters will not be ready in time, and I trust that I may receive very early orders to put the work in hand according to Captain Ellis' proposals.

5. I should be glad if orders could be sent to me by wire as soon as the estimate is approved, for every week's delay is of importance.

ENCLOSURE.

REPORT to accompany estimate for erecting falling shutters on the Kistna anicut.

The type of shutters proposed for adoption is similar in action to the 4 acres tumbler shutters erected on the Sone weir in Bengal. There are, however, differences in detail.

The shutter proposed is 10' long by 3' high with 1" round connecting rods 3' 1" long from centre to centre of pivot bolts.

The material difference in the design from the shutters used on the Sone are two:

(a) The shutter travels on three plate iron ways 4" wide fixed on the anicut, and on these ways curved plates fixed to the shutter slide; whereas on the Sone weir the bottom angle iron was placed along the bottom edge of the shutter and the edge of this scrapes along the stone bed, on which the shutter rests throughout its whole length when the shutter falls or is lifted. This renders necessary a greater force to lift the shutter, and irregular action in falling.

(b) The joint to seal the escape of water between the anicut and length of the shutter is formed on the Sone by the angle iron resting on the stone sill as above mentioned.

The design for the Kistna shutters provides for a joint formed by the edge of the angle iron forming the lower stringer of the shutter butting against a continuous wooden blocks (backed by stone) which performs the double duty of stop block and water joint. The advantage of this is that the water pressure itself tends to close the joint, and the lower the water falls (within limits), the tighter becomes the joint.

Experimental shutters.—Three types of shutters were erected on the anicut in April and May last, viz.:—

- (1) The Sone type with $\angle$ iron forming bottom stringer resting on a stone sill.
- (2) A shutter, curved plates fixed at intervals to the bottom of the shutter and sliding on 4" wide plate iron ways fixed on the anicut crest. This is the type now selected for adoption.
- (3) Similar to (2) but with 3" cast-iron rollers in place of curved plates. Details of all these shutters, 14 in number, and of various lengths from 8 feet to 19 feet, are given in the estimate for the erection of the work.

Notes regarding experiences with experimental shutters.—The drawings with this estimate give full details of the shutter selected as the best suitable, and the following notes give a few experiences with the experimental shutters, and by inference the reasons which have led to the present design.

Size of scantlings of frame.—Calculations were made to proportion these exactly to the work they had to do in order to cut down the weight as far as possible.

Experience has shown that the weight of the shutter bears a small proportion to the force required to lift it, as in addition to the shutter, the water laying on it must be raised.

For instance, two men can raise a 16' $\times$ 3' shutter without any water going over, but eight men are required to raise the same shutter with 9 inches of water passing over it.

There was noticed a great tendency for the shutters to buckle out of a plane which caused much trouble and delay when making.

The scantlings of the angle iron stringers have been increased from $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$ to $3 \times 2 \times \frac{3}{8}$ in consequence.

Force required to lift.—This has been tried with 9 inches of water passing over the shutters, by raising by hand, the men lifting in a row from the downstream side of the shutter:

- | |
|--|
| 19 ft. Sone pattern shutter—14 men raised with difficulty. |
| 12 ft. Sone pattern shutter—10 men raised with difficulty. |
| 16 ft. roller shutter—10 men raised, one easily, one with some difficulty. |
| 16 ft. curved plate shutters—10 men raised with some difficulty. |
| 8 ft. curved plate shutter—4 men raised. |
| 14 ft. curved plate shutter—8 men raised with difficulty. |

Force required to overturn.—When 1 foot of water was held up by the shutters, the numbers of men required to overturn the shutters were as under:

- | |
|--|
| 16 ft. roller shutters—4 men to one shutter, 3 men to another. |
| 16 ft. curved plate—4 men with difficulty. |
| 8 ft. curved plate—2 men. |
| 14 ft. curved plate—3 men. |

The Sone pattern shutters took one man for every 2 running feet to pull over.

No. 786 I., 26TH AUGUST 1897.

Again, head for overturning—

$$x = \frac{M}{1\frac{1}{2} \times 62.5 \times \frac{1}{12}} \text{ feet} = \left(\frac{80 \times 12 \times 12}{1\frac{1}{2} \times 62.5} \times \frac{1}{9} \right) \text{ inches.}$$

$$= \frac{122.88}{9} = 13.65 \text{ inches.}$$

Head for overturning = 13.65.

Total head = 19.65 inches.

Similarly, with pivot at 13 inches—

 $a = 23$ $b = 13$ $h = 26.6$. Head for equilibrium = 3.6.

$$\text{Head for overturning} = \frac{122.88}{10} = 12.288 \text{ inches.}$$

Total head = 15.88 inches;

and when pivot is at $12\frac{1}{2}$ inches— $a = 23\frac{1}{2}$ $b = 12\frac{1}{2}$ $h = 25.1$. Head for equilibrium = 1.6.

$$\text{Head for overturning} = \frac{122.88}{11} = 11.17 \text{ inches.}$$

Total head = 12.77 inches.

(Signed) W. M. ELIIS, Captain, R.E.,
Executive Engineer.

No. 162 I.

Note by the Chief Engineer for Irrigation.

It was decided last year, in consultation with the Inspector-General of Irrigation, to recommend the lowering of the crest of the Kistna anicut 2 feet and fit falling shutters. An estimate for the latter was called for in G.O., No. 75 I., dated 20th January 1897, and is now submitted.

2. It is believed the designs will be found in every way suitable. They have been prepared after experiments with shutters of different lengths and patterns described in the report printed with G.O., No. 641 I., dated 12th July 1897. The Executive Engineer reports on these experiments and his discussion of various points of the designs contain much information which will be found of value in preparing designs for similar work elsewhere.

3. The upper 2 feet of the anicut were removed in last hot weather and it is therefore of the utmost importance that the shutters should be fitted with the least practicable delay. The work should be completed without fail by the middle of May next and, to ensure this, it is necessary to enter into contracts at once as the Bezwada workshops cannot turn out many shutters, and the Madras workshop is likely to be fully occupied in preparing shutters for works in the Southern districts. Permission is requested to purchase iron (about 12 tons) locally for the shutters which it is proposed to make at Bezwada.

13th August 1897.

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

ORDER—No. 786 I., dated 26th August 1897.

Kistna Delta System.
Kistna Northern Division.

1. Head Works.

3. Works.

Fitting shutters to the crest of the Kistna anicut.

I. Works	...	...	...	47,200
II. Establishment	...	...	...	10,856
III. Tools and Plant	...	...	...	714

Total Estimate ... 58,770

The estimate submitted by the Chief Engineer for Irrigation for the marginally-noted work is approved.

2. Fifty shutters should be made at the Government workshops, and for these the material may be purchased in India, if necessary. The remaining shutters may be obtained on contract from selected firms in India.

3. Ordered that a copy of these Proceedings, together with the plans and

No. 786 I., 26TH AUGUST 1897.

estimate for the work, be forwarded to the Government of India, with a request that early sanction thereto may be accorded under "49. Capital Expenditure not charged to Revenue," Kistna Delta System.

[Here enter No. 787 I., dated 26th August 1897.]

(True Extract.)

(Signed) W. HUGHES,
Joint Secy. to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.

ENDORSEMENT—No. 787 I., dated 26th August 1897.

Forwarded.

(By order.)

(Signed) W. HUGHES,
Joint Secy. to Government,
Irrigation Branch.

GENERAL.
ACCOUNT.

Government {1897} of Madras.
PUBLIC WORKS.

Recd.

Enclosures

1897.

Regd.

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G.O., No. 2265 W., 18th August 1897.

AUGUST.

Local purchase of European Stores.

Sanctioning the — required for use in Kistna Northern division remarking that, as regards repairs to floating plant at any rate, the requirements should have been foreseen in time to have procured English stores by indent on the Home Government, and requesting the Chief Engineer for Irrigation to submit his opinion in regard to the advisableness of locally purchasing the iron required for providing falling shutters to the Kistna anicut.



GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Account.

READ—the following papers:—

Endorsement of the Superintending Engineer, II Circle, dated 8th June 1897, No. 765 K.N.

Forwarded to the Chief Engineer, Public Works Department, for favour of sanction of Government being obtained.

2. It was impossible to foresee the necessity of providing falling shutters to the Kistna anicut and it was essential that the experimental ones should be fitted before the river rose this year.

3. There is no iron available for making the complete set of shutters for the whole length of the crest, and as the exact sizes of iron cannot be decided on until the result of the experiments is known (which will be towards the end of the year), irrigation interests to the extent of many thousands of acres will clash with the orders prohibiting local purchases.

4. A further report will be sent in on this subject, as the risk to the water-supply of the delta by leaving the crest 2 feet lower than it ought to be, will be very great. This year the risk is unavoidable; but next year it would be advisable to permit the local purchase of the iron for the shutters, if the Public Works Stores cannot supply and if it is found impossible to send home an indent sufficiently early to make certain that the shutters will be all erected before the irrigation season of 1898-99.

5. As regards the punts for the Cockburn dredgers, the Executive Engineer was only too anxious to bring this valuable plant into use. It is now lying unused for want of punts to mount it upon.

6. The floating plant could not be left unrepaired, as this would mean stoppage of work throughout the deltas.

Stringent orders have been issued by the undersigned on G.O., No. 1142 W., dated 3rd May 1897, and every effort will be made to comply with the rules; but in certain cases the rules and the interests of Government will not be in accord; and where serious responsibility is involved, such as delay in putting the Kistna anicut into order, this responsibility cannot be placed upon the Executive Engineer.

(Signed) W. M. ELLIS,
for Supg. Engineer, II Circle.

No. 2906 C.

Forwarded to the Superintending Engineer, V Circle, with the request that the "estimated cost, if obtained through the India Office" in the cases marked "not known," may be entered if possible.

16th June 1897.

(Signed) C. H. B. BURLTON,
Deputy Chief Engineer.

From Lieutenant-Colonel C. C. RAWSON, R.E., Superintending Engineer, V Circle, to the Chief Engineer, Public Works Department, dated Chepāk, 27th July 1897, No. 288 W.

With reference to your endorsement No. 2906 C., dated 16th June 1897, herewith returned, I have the honour to state "that the estimated cost, if obtained through the India Office" in the application for the local purchase of certain European stores in the Kistna Northern division, forwarded therewith, has been filled in.

2. The following articles included in the application referred to above are available in the Public Works Stores:—

Linseed oil, boiled	...	...	...	...	...	100 gals.
" raw	...	...	...	...	...	25 "
Silicate white paint paste No. 1	...	...	...	...	...	56 lb.
Copal varnish	...	...	...	...	...	4 gals.
Vermillion	...	...	...	...	...	3½ lb.

ORDER—No. 2265 W., dated 18th August 1897.

The articles enumerated in the list submitted by the Superintending Engineer, II Circle, having already been procured, their local purchase is sanctioned under clause 2, rule 3, Appendix X, Volume II, Public Works Code.

2. It appears to the Government that, as regards repairs to floating plant at any rate, the requirements should have been foreseen in time to have procured English stores by indent on the Home Government. Some of the articles required for this service were available in the Public Works Stores, Madras, and might have been obtained from there if proper inquiries had been made.

3. The Chief Engineer for Irrigation will submit his opinion on the proposal in paragraph 4 of the endorsement from the Superintending Engineer, II Circle.

(True Extract.)

(Signed) D. McNEIL CAMPBELL, Colonel, R.E.,
Secretary to Government.

To the Superintending Engineer, II Circle.

" Chief Engineer for Irrigation."
" Examiner, Public Works Accounts, with statement for note and return."

Exd. T. K. Narayana Aiyangar.