5

Public Works (1899) Department.

Printed

RAILWAY BRANCH.

G.O., No. 656. Ry

DATED 12th June 1899

150/8

[Despatch Abstract.]

Degree of safety to be depended on for bridges

Drawing attention of the Ry Authorities Concerned to the advisability of adopting on their lines the procedure indicated in the letter from the Director of Ry Construction in regard to the recording of certain info. to determine on the spot the —— & suggesting the Govt Inspectors of Rys should, in the course of their inspections, the instructions laid down in para 3 of the letter.

Indexed

[P. W. 26. 253—14-3-99.]

BACK PAPERS.

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RAILWAY.

Government {1899} of Madras.

PUBLIC WORKS.

Recd.
Regd. } 1899.

Enclosures
Spare copies

G.O., No. 656 Ry., 12th June 1899.

JUNE.

Degree of Safety to be depended on for Bridges

Drawing attention of the Railway Administrations concerned to the advisability of adopting on their lines the procedure indicated in the letter from the Director of Railway Construction in regard to the recording of certain information to determine on the spot the — and requesting the Government Inspectors of Railways to note, in the course of their inspections, the instructions laid down in paragraph 3 of the letter.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following paper:—

From—The Secretary to the Government of India, Public Works Department.
To—The Joint Secretary to the Government of Madras, P.W. Dept., Ry. Branch.
Dated—Simla, 23rd May 1899, No. 919 R.C.

I am directed to forward, for information, the accompanying copy of a Circular, which has been addressed by the Director of Railway Construction to all Managers and Engineers-in-Chief of State Railways under his control, conveying instructions in regard to the recording of certain information, which will enable Engineers and Permanent-way Inspectors to determine on the spot the degree of safety to be depended on for bridges.

2. It is requested that copies of the same may be furnished to the Agents of the Companies' railways under the control of the Government of Madras with a suggestion as to the advisability of their taking similar action to that ordered on State Railways.

3. All Government Inspectors of Railways should also be instructed to note from time to time, in the course of their inspections of all railways, and particularly of those under construction, what action has been taken to record such information on the bridges; and, in the case of open lines, to report on the subsequent care taken to maintain the record.

Enclosure.

From—The Director of Railway Construction.
To—The Managers, North-Western, Eastern Bengal, Oudh and Rohilkhand and East Coast Railways.
The Engineers-in-Chief, Indus Bridge Works, Ghaziabad-Moradabad Railway, Godavari Bridge Works, and Hurdwar-Dehra Railway.
Dated—Simla, 22nd May 1899, No. 905 R.C.

Cases will doubtless be within your recollection where the difficulties of maintaining railways in flood time have been much increased in consequence of the Engineers and Permanent-way Inspectors responsible for the maintenance being inadequately informed of the nature and depth of the foundations of the bridges which they have to protect against scour. Even if full particulars on these points have been recorded on the completion drawings, as prescribed in Public Works Department Code, volume I, Chapter IX, paragraph 44, still these may not be at hand when most wanted. It is, therefore, very desirable that the most important particulars should be recorded *on the bridges themselves*, so that those responsible for their maintenance may be able to ascertain on the spot the condition and degree of safety of the bridges threatened, and to take whatever measures may be necessary with confidence and promptitude.

2. The information most necessary in such cases is—

(*a*) nature of foundation, *e.g.*, wells, blocks, screw-piles or cylinders, concrete, rock, etc. etc.;
(*b*) nature of strata passed through and reached;
(*c*) depth from some known point to the bottom of foundation, top of floor, bottom of drop wall, etc. etc.;

and it is of some importance that the system adopted for recording it should be concise and methodical, and of as universal application as possible so that it may be intelligible to any one who may have to interpret it on any sudden emergency.

3. The following system will be found to fulfil these conditions. A stone or other slab should be fixed on or over each pier or abutment, with an inscription giving the required information in abbreviated form on the following principle:—

WL = Well foundation.
BK = Block „
SP = Screw-pile foundation.
IC = Iron cylinder.
CN = Concrete.
TP = Timber piling.
etc. etc.

BF = Bottom of foundation below this inscription.
* TF = Top of „ „ „ „
TA = Top of apron or flooring „ „ „
TI = Top of invert „ „ „ „
BD = Bottom of drop wall „ „ „
RL—BF = Depth from rail level to bottom of foundation.
etc. etc.

S = Sand.
C = Clay.
G = Gravel or shingle.
M = Moorum.
A = Alluvium, silt, or earth.
R = Rock.
etc. etc.

other symbols will doubtless suggest themselves such as—

WW = Wing wall.
US = Upstream.
DS = Downstream.
TP = Top of pitching.
BP = Bottom of pitching.
WN = Wire netting.
CW = Cribwork.
etc. etc.

4. For example, a stone inscribed thus and built on to the top of a pier—

WL
BF = 69
TF = 29
S = 25
C = 15

would indicate that the foundation is a well whose bottom and top are respectively 69 feet and 29 feet below the inscription, and that the strata passed through were 25 feet sand and 15 feet clay. Or a stone thus—

CN = 4
BF = 21
TA = 17
BD = 25
A

would indicate an open foundation on 4 feet of concrete, founded 21 feet below the inscription; also that there is a continuous apron or floor, and a drop wall whose top and bottom respectively are 17 feet and 25 feet below the inscription and that all are in alluvium.

5. On bridges already built it may be impracticable to give so much detail, and in that case a simple inscription cut in some convenient and conspicuous place on the masonry, with a line to show where the depth is to be measured from, thus—

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* The symbol T.F. would be used for top of well, or block, or of concrete foundation just below the footings, in cases where there is no floor or invert.

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would indicate that the foundation is a well whose bottom and top are respectively 69 feet and 29 feet below the inscription, and that the strata passed through were 25 feet sand and 15 feet clay. Or a stone thus—

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BF = 21
TA = 17
BD = 25
A

would indicate an open foundation on 4 feet of concrete, founded 21 feet below the inscription; also that there is a continuous apron or floor, and a drop wall whose top and bottom respectively are 17 feet and 25 feet below the inscription and that all are in alluvium.

5. On bridges already built it may be impracticable to give so much detail, and in that case a simple inscription cut in some convenient and conspicuous place on the masonry, with a line to show where the depth is to be measured from, thus—

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or

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would suffice.

* The symbol T.F. would be used for top of well, or block, or of concrete foundation just below the footings, in cases where there is no floor or invert.

6. Or, if desired, the depths may be referred to rail level and not to the level of the inscription itself, in which case the inscription would be somewhat thus—

WL
RL — BF = 74
RL — TF = 34
S = 25
C = 15

or

RL — BF = 74

and for such cases a cast iron plate would probably be found convenient, which would be bolted to either the masonry or the girder, giving the information in as much detail as thought desirable.

7. Some Engineers may prefer to show the reduced levels instead of the depths, and there would be no objection to this provided it is adopted over a whole railway and not mixed up with the other system. But in order to prevent reduced levels being mistaken for depths it would be well always to show them to at least one place of decimals, and invariably to show rail level as well as foundation level, thus—

WL
RL = 48·7
TF = + 15·0
BF = — 25·3
S = 25
C = 15

8. I have the honour, therefore, to request that you will issue instructions for the above information to be shown distinctly on each pier and abutment of all *new* bridges and culverts of 10 feet span and over, without exception, in future. Also that you will arrange now to add it upon such existing bridges as are, in your opinion, of sufficient importance to warrant the expense, and for which *reliable* information of the foundations is known.

9. Care must of course be taken to place each inscription at a point which is conspicuously visible and convenient of access during a flood, and also to use durable materials for the slabs, &c. This is particularly necessary if the face of the slab is horizontal, a position which should be avoided if practicable. If iron plates are used the letters should be *cast* on them, not painted. Perhaps metal figures imbedded in slabs of Portland or other cement may be found satisfactory and inexpensive.

Order—No. 656 Ry., dated 12th June 1899.

The attention of the Agents, Madras, South Indian, and His Highness the Nizam's Guaranteed State Railways is drawn to the advisability of adopting on their lines the procedure indicated in the Director of Railway Construction's letter No. 905 R.C., dated 22nd May 1899.

2. The Government Inspectors of Railways, Madras, are requested to note the instructions in paragraph 3 of the Government of India's letter.

(True Extract.)

Francis J. E. Spring,
Joint Secretary.

To the Agent and Manager, Madras Railway.
" Agent, South Indian Railway.
" Agent and Manager, His Highness the Nizam's Guaranteed State Railway.
" Government Inspectors of Railways, Madras.
" Consulting Engineer for Railways.

Exd. P. Seetharam.

2 5 f

No. 905 R.C.

From

The Director of Railway Construction,

To

The Managers, North Western, Eastern Bengal, Oudh and Rohilkhand and East Coast Railways.

The Engineers-in-Chief, Indus Bridge Works, Ghaziabad-Moradabad Railway, Godaveri Bridge Works, and Hurdwar-Dehra Railway.

Simla, the 22nd May 1899.

Sir,

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would indicate that the foundation is a well whose bottom and top are respectively 69 feet and 29 feet below the inscription, and that the strata passed through were 25 feet sand and 15 feet clay. Or a stone thus—

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would indicate an open foundation on 4 feet of concrete, founded 21 feet below the inscription; also that there is a continuous apron or floor, and a drop wall whose top and bottom respectively are 17 feet and 25 feet below the inscription and that all are in alluvium.

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I have the honour to be,

SIR,

Your most obedient Servant,

C. W. HODSON.

Director.

Documents accompanying.
Nil.

G. C. Press, Simla.—No. 365 P. W. D.—26-5-99.—900.

JOINT SECRETARY TO
RECEIVED
8 JUN 1899
GOVT. OF MADRAS RY.

No. 919 R. C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY CONSTRUCTION.

Dated Simla, the 23rd May 1899.

To

THE JOINT SECRETARY TO THE GOVERNMENT OF MADRAS, PUBLIC WORKS DEPARTMENT, RAILWAY BRANCH.

THE SECRETARY TO THE GOVERNMENT OF BOMBAY, PUBLIC WORKS DEPARTMENT, RAILWAY BRANCH.

THE SECRETARY TO THE GOVERNMENT OF BURMA, PUBLIC WORKS DEPARTMENT, RAILWAY BRANCH.

THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR RAILWAYS, CALCUTTA.

THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR RAILWAYS, LUCKNOW.

THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR RAILWAYS, ASSAM.

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I have the honour to be,

SIR,

Your most obedient servant,

C. T. Wolf

Offg. Under Secy.

Document accompanying.

Copy of the Director of Railway Construction's Circular Letter referred to.

G. C. Press, Simla.—No. 2340 P. W. D.—29-5-99—500.

To

The Joint Secy to the Govt of Madras,
Public Works Department, Ry Branch.

Public Works (1899) Department.

P. W. Ry

CURRENT No. 757.

A (Chief)

A

48 From The Govt of India.

Order- No. 65-C.Ry dated 12/6/99.

No. 919 R-C.

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Dated 23d May 1899.

Received 8th June '99

Registered —— do ——

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To AM
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N.G.S.Ry
Govt Inspr of Rys Madras
E.R.

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3. All Government Inspectors of Railways should also be instructed to note from time to time, in the course of their inspections of all railways, and particularly of those under construction, what action has been taken to record such information on the bridges; and, in the case of open lines, to report on the subsequent care taken to maintain the record.

Enclosure.

From—The Director of Railway Construction.
To—The Managers, North-Western, Eastern Bengal, Oudh and Rohilkhand and East Coast Railways.
The Engineers in-Chief, Indus Bridge Works, Ghaziabad-Moradabad Railway, Godavari Bridge Works, and Hurdwar-Dehra Railway.
Dated—Simla, 22nd May 1899, No. 905 R.C.

Cases will doubtless be within your recollection where the difficulties of maintaining railways in flood time have been much increased in consequence of the Engineers and Permanent-way Inspectors responsible for the maintenance being inadequately informed of the nature and depth of the foundations of the bridges which they have to protect against scour. Even if full particulars on these points have been recorded on the completion drawings, as prescribed in Public Works Department Code, volume I, Chapter IX, paragraph 44, still these may not be at hand when most wanted. It is, therefore, very desirable that the most important particulars should be recorded *on the bridges themselves*, so that those responsible for their maintenance may be able to ascertain on the spot the condition and degree of safety of the bridges threatened, and to take whatever measures may be necessary with confidence and promptitude.

2. The information most necessary in such cases is—

(*a*) nature of foundation, *e.g.*, wells, blocks, screw-piles or cylinders, concrete, rock, etc. etc.;
(*b*) nature of strata passed through and reached;
(*c*) depth from some known point to the bottom of foundation, top of floor, bottom of drop wall, etc. etc.;

and it is of some importance that the system adopted for recording it should be concise and methodical, and of as universal application as possible so that it may be intelligible to any one who may have to interpret it on any sudden emergency.

3. The following system will be found to fulfil these conditions. A stone or other slab should be fixed on or over each pier or abutment, with an inscription giving the required information in abbreviated form on the following principle:—

WL = Well foundation.
BK = Block ,,
SP = Screw-pile foundation.
IC = Iron cylinder.
CN = Concrete.
TP = Timber piling.
etc. etc.

BF = Bottom of foundation below this inscription.
* TF = Top of ,, ,, ,, ,,
TA = Top of apron or flooring ,, ,, ,,
TI = Top of invert ,, ,, ,, ,,
BD = Bottom of drop wall ,, ,, ,,
RL—BF = Depth from rail level to bottom of foundation.
etc. etc.

S = Sand.
C = Clay.
G = Gravel or shingle.
M = Moorum.
A = Alluvium, silt, or earth.
R = Rock.
etc. etc.

other symbols will doubtless suggest themselves such as—

WW = Wing wall.
US = Upstream.
DS = Downstream.
TP = Top of pitching.
BP = Bottom of pitching.
WN = Wire netting.
CW = Cribwork.
etc. etc.

4. For example, a stone inscribed thus and built on to the top of a pier—

WL
BF = 69
TF = 29
S = 25
C = 15

would indicate that the foundation is a well whose bottom and top are respectively 69 feet and 29 feet below the inscription, and that the strata passed through were 25 feet sand and 15 feet clay. Or a stone thus—

CN = 4
BF = 21
TA = 17
BD = 25
A

would indicate an open foundation on 4 feet of concrete, founded 21 feet below the inscription; also that there is a continuous apron or floor, and a drop wall whose top and bottom respectively are 17 feet and 25 feet below the inscription and that all are in alluvium.

5. On bridges already built it may be impracticable to give so much detail, and in that case a simple inscription cut in some convenient and conspicuous place on the masonry, with a line to show where the depth is to be measured from, thus—

BF. 69
TF. 29

or

TA. 17
BD. 25

would suffice.

* The symbol T.F. would be used for top of well, or block, or of concrete foundation just below the footings, in cases where there is no floor or invert.

6. Or, if desired, the depths may be referred to rail level and not to the level of the inscription itself, in which case the inscription would be somewhat thus—

WL
RL — BF = 74
RL — TF = 34
S = 25
C = 15

or

RL — BF = 74

and for such cases a cast iron plate would probably be found convenient, which would be bolted to either the masonry or the girder, giving the information in as much detail as thought desirable.

7. Some Engineers may prefer to show the reduced levels instead of the depths, and there would be no objection to this provided it is adopted over a whole railway and not mixed up with the other system. But in order to prevent reduced levels being mistaken for depths it would be well always to show them to at least one place of decimals, and invariably to show rail level as well as foundation level, thus—

WL
RL = 48·7
TF = + 15·0
BF = — 25·3
S = 25
C = 15

8. I have the honour, therefore, to request that you will issue instructions for the above information to be shown distinctly on each pier and abutment of all *new* bridges and culverts of 10 feet span and over, without exception, in future. Also that you will arrange now to add it upon such existing bridges as are, in your opinion, of sufficient importance to warrant the expense, and for which *reliable* information of the foundations is known.

9. Care must of course be taken to place each inscription at a point which is conspicuously visible and convenient of access during a flood, and also to use durable materials for the slabs, &c. This is particularly necessary if the face of the slab is horizontal, a position which should be avoided if practicable. If iron plates are used the letters should be *cast* on them, not painted. Perhaps metal figures imbedded in slabs of Portland or other cement may be found satisfactory and inexpensive.

Order—No. 656 Ry., dated 12th June 1899.

The attention of the Agents, Madras, South Indian, and His Highness the Nizam's Guaranteed State Railways is drawn to the advisability of adopting on their lines the procedure indicated in the Director of Railway Construction's letter No. 905 R.C., dated 22nd May 1899.

2. The Government Inspectors of Railways, Madras, are requested to note the instructions in paragraph 3 of the Government of India's letter.

(True Extract.)

Francis J. E. Spring,
Joint Secretary.

To the Agent and Manager, Madras Railway.
" Agent, South Indian Railway.
" Agent and Manager, His Highness the Nizam's Guaranteed State Railway.
" Government Inspectors of Railways, Madras.
" Consulting Engineer for Railways.

Exd. P. Seetharam.

2 5 f

No. 905 R.C.

From

The Director of Railway Construction,

To

The Managers, North Western, Eastern Bengal, Oudh and Rohilkhand and East Coast Railways.

The Engineers-in-Chief, Indus Bridge Works, Ghaziabad-Moradabad Railway, Godaveri Bridge Works, and Hurdwar-Dehra Railway.

Simla, the 22nd May 1899.

Sir,

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I have the honour to be,

SIR,

Your most obedient Servant,

C. W. HODSON.

Director.

Documents accompanying.
Nil.

G. C. Press, Simla.—No. 365 P. W. D.—26-5-99.—900.

JOINT SECRETARY TO
RECEIVED
8 JUN 1899
GOVT. OF MADRAS RY.

No. 919 R. C.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY CONSTRUCTION.

Dated Simla, the 23rd May 1899.

To

THE JOINT SECRETARY TO THE GOVERNMENT OF MADRAS, PUBLIC WORKS DEPARTMENT, RAILWAY BRANCH.

THE SECRETARY TO THE GOVERNMENT OF BOMBAY, PUBLIC WORKS DEPARTMENT, RAILWAY BRANCH.

THE SECRETARY TO THE GOVERNMENT OF BURMA, PUBLIC WORKS DEPARTMENT, RAILWAY BRANCH.

THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR RAILWAYS, CALCUTTA.

THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR RAILWAYS, LUCKNOW.

THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR RAILWAYS, ASSAM.

SIR,

I am directed to forward, for information, the accompanying copy of a Circular, which has been addressed by the Director of Railway Construction to all Managers and Engineers-in-Chief of State Railways under his control, conveying instructions in regard to the recording of certain information, which will enable Engineers and Permanent-way Inspectors to determine on the spot the degree of safety to be depended on for bridges.

2. It is requested that copies of the same may be furnished to the Agents of the Companies' railways under ~~the control of the Government of your control~~ Madras with a suggestion as to the advisability of their taking similar action to that ordered on State Railways.

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I have the honour to be,

SIR,

Your most obedient servant,

C. T. Wolf

Offg. Under Secy.

Document accompanying.

Copy of the Director of Railway Construction's Circular Letter referred to.

G. C. Press, Simla.—No. 2340 P. W. D.—29-5-99—500.

To

The Joint Secy to the Govt of Madras,
Public Works Department, Ry Branch.

Public Works (1899) Department.

P. W. Ry

CURRENT No. 757.

A (Chief)

A

48 From The Govt of India.

Order- No. 65-C.Ry dated 12/6/99.

No. 919 R-C.

"The attention of the Agents Madras, South Indian, and B. N. the N. G. S. Rys is drawn to the advisability of adopting on their lines the procedure indicated in the D.R.C's letter No. 705 Rc, dated 22. 5. 99.

2. The Govt Inspector of Railways, Madras, are requested to note the instructions in para 3 of the Govt of India letter.

Dated 23d May 1899.

Received 8th June '99

Registered —— do ——

Enclosures

Spare copies

SUBJECT.

Degree of safety to be defended on for bridges

Forwarding for information copy of a circular by the Director of Ry Construction conveying instructions in regard to the recording of certain information to determine in the abol the ——

To AM
A
N.G.S.Ry
Govt Inspr of Rys Madras
E.R.

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

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