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 (2) புதுக்கித் திருப்பிய நாள் 8/20
 (3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம் 6/20

தமிழ்நாடு ஆவணக் காப்பகம்.

(27)

தமிழ்நாடு அரசு

P. W. D. - துறை

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2/20

14. Sheets

ஆவண, கா-1-18,006-15-6-87.

[General Distribution.]

Circular No. 2 Railway.

GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
RAILWAY STORES.

Calcutta, the 10th February 1891.

Preparation in India of Indents for Iron and Steel.

The Government of India has received from Her Majesty's Secretary of State for India, revised instructions to facilitate the compilation, on a uniform basis, of indents for iron and steel. These are herewith forwarded to the Local Governments, Administrations and officers noted in the margin, for information and guidance, in continuation of Public Works

The Governments of Madras, Bombay, Bengal, North-Western Provinces and Oudh, and the Punjab.
The Chief Commissioners of the Central Provinces, Burma, Assam and Coorg.
The Resident, Hyderabad.
The Resident in Mysore.
The Agents to the Governor General for Rajputana, Central India and Baluchistan.
The Director General of Railways.
The Consulting Engineers to the Government of India for Railways, Calcutta, Central Division and Lucknow.
The Accountant General, Public Works Department.
The Director General of Telegraphs.

Department Circular No. 2 Railway of the 15th February 1890.

2. These instructions are applicable to all Branches of the Public Works Department.

By order,

F. B. HEBBERT,

Offg. Under Secretary.

Suggestions as to the preparation in India of Indents for Iron and Steel.

Bar Iron and Bar Steel (Mild).

1. Unless certain lengths are required for a specific purpose the indent should show for each item the section and total weight only, the bars will then be supplied in commercial lengths (see para. 6 of Specification of Iron and para. 9 of Specification of Bar Steel). When dead lengths are required, i.e., lengths correct to within one-eighth of an inch, "in dead lengths" should be specified in the indent. Commercial lengths are generally correct to within about 3 inches, i.e., 19 feet 9 inches or 20 feet 3 inches would be passed as 20 feet.

Plates and Sheets (Iron and Mild Steel).

2. The dimensions and total weight required should in all cases be stated, but unless a certain number of plates or sheets is required the number should not be stated but only the total weight required. When plates of special sizes are demanded it should be stated whether

the length or width is to be adhered to, in case manufacturers are unable to supply plates of the dimensions required. The limits given below should in no case be exceeded.

MAXIMUM.				REMARKS.
Thickness.	Length.	Width.	Area.	
Inches.	Feet.	Ft. ins.	Sq. feet.	
$\frac{1}{8}$	14	4 0	28	The area of sheets less than $\frac{1}{8}$ inch thick should not, if possible, exceed 18 square feet.
$\frac{3}{16}$	18	4 6	31	
$\frac{1}{4}$	22	5 0	40	
$\frac{5}{16}$	25	5 3	50	
$\frac{3}{8}$	30	5 6	65	
$\frac{7}{16}$	33	6 3	75	
$\frac{1}{2}$	35	6 9	80	
$\frac{9}{16}$	38	7 3	90	
$\frac{5}{8}$	40	7 9	100	
$\frac{3}{4}$	40	8 0	110	
$\frac{7}{8}$	37	8 4	120	
1	35	8 9	130	
$1\frac{1}{8}$	31	8 9	130	
$1\frac{1}{4}$	31	8 9	125	
$1\frac{1}{2}$	28	8 9	120	
		8 9	110	

The maximum area divided by any length (not exceeding maximum) will give maximum width for that length; maximum length for any given width (not exceeding maximum) can be similarly determined.

Corrugated Sheets.

3. The thickness should be stated by the Imperial Standard wire gauge (S. W. G.) before galvanizing, and the size of the flutes given; those most commonly used are 3 inches $\times$ $\frac{3}{4}$ inches and 5 inches $\times$ $1\frac{1}{2}$ inches. The usual dimensions for length and width (from centre to centre of outside flutes) are 7 to 8 feet and $2\frac{1}{2}$ feet respectively. Sheets of larger dimensions are charged for as extra sizes. The number of sheets required or the weight should be stated in the indent; if both are stated the number will be followed in execution.

Cast Steel.

4. In demanding cast steel care should be taken to specify the percentage of carbon required or the purpose for which the steel is to be used, as otherwise manufacturers cannot determine the most suitable "temper" (or percentages of carbon) for the supplies. When this information is omitted the size is the only clue to guide the manufacturer, and it affords no guidance whatever in the case of round or square sections. The following is a list of the most useful tempers:—

Razor temper ($1\frac{1}{2}$ per cent. of carbon) can only be placed in the hands of skilful workmen. If properly treated, useful for turning chilled rolls.

Saw-file temper ($1\frac{3}{8}$ per cent.) requires careful treatment, should not be heated above cherry red.

Tool temper ($1\frac{1}{4}$ per cent.), useful for turning tools, drills, and planing machine tools; can only be welded with greatest care and skill.

Spindle temper ($1\frac{1}{2}$ per cent.) useful for circular cutters, very large turning tools, taps, screwing dies, &c.; considerable care required in welding.

Chisel temper (1 per cent.), very tough when unhardened, and hardens at a low heat. Well adapted for tools such as cold chisels, hot sets, &c., which require a hard cutting edge, but whose unhardened parts must stand the blow of a hammer without snapping.

Sett temper ($\frac{1}{2}$ per cent.), useful for tools such as cold setts whose unhardened parts have to stand the blows of a very heavy hammer. Easily welded by skilled workmen.

Die temper ($\frac{3}{4}$ per cent.), useful for tools requiring the surface only to be hard, and capable of standing great pressure, such as stamping or pressing dies. Easily welded by a skilled workman.

The above information as to cast steel is taken from a paper by Henry Seebohm, read before the Iron and Steel Institute in 1884.

Calculation of Estimated Weights.

To ensure uniformity in the method of estimating the weights of iron and steel demanded, it is desirable that Jordan's Tabulated Weights of Iron and Steel should be used.

Specification of Bar Iron.

1. The iron is to be of the description known as "puddled," soft and fibrous, thoroughly well made, uniform in texture, and perfectly free from lamination and all defects of manufacture.

It will be subjected to the following tests for tensile strength and contraction of area, as well as to the forge tests in use in the India Store Depot, where patterns of these forge tests can be seen:—

Description of Iron.	Tensile Strain per Square inch of original Section to be borne without breaking.	Reduction of Area at point of Fracture to be not less than	Pattern Nos. of Forge Tests.
	Tons.	Per Cent.	
Bars and rods, 4 square inches and under in sectional area, and hoop			
Ditto, ditto, above 4 and not exceeding 8 square inches in sectional area			
Ditto, ditto, above 8 square inches in sectional area			
Channel, angle, and tee			
Rivet			

2. The Superintendent of the India Store Depot, or his Deputy, will select such samples as may be necessary, at the Contractor's works, and will see pieces 16 inches in length cut from them for machine and forge tests; these pieces will be tested at the Contractor's works or elsewhere under direction of the Superintendent or his Deputy, as may be directed at the time.

3. Any iron not standing the specified test will be rejected.

4. The Contractor is, at his own expense, to cut and forward, as may be directed by the Superintendent, the samples which have been tested at his works, or which may be required for testing elsewhere.

5. No charge is to be made for the samples used in testing nor for any testing carried out at the Contractor's works.

6. Bars, &c., are to be supplied in the following lengths, unless otherwise specified in the Schedule, and sent loose with the exceptions mentioned in paragraph 7:

Description of Iron.	Lengths.
	Feet.
Rod—	
$\frac{3}{8}$ inch diameter and under	14
$\frac{1}{2}$ inch to $\frac{1}{4}$ inch diameter	16
Above $\frac{1}{4}$ inch diameter	20
Square—	
$\frac{3}{8}$ inch side and under	14
$\frac{1}{2}$ inch to $\frac{1}{4}$ inch side	16
Above $\frac{1}{4}$ inch side	20
Angle, tee, channel—	
$\frac{3}{8}$ inch and under in thickness	16
Above $\frac{3}{8}$ inch in thickness	20
Flat bars	20
Hoop	36 to 40

The weights given in the Schedule must in no case be exceeded. To make up the Schedule weights one shorter bar, &c., of each description will be accepted, except in cases where the number and dimensions of the bars, &c., are specified, in addition to the weight. The Schedule weights in such cases include an allowance of 5 per cent. above "book" weights, and show the maximum weight of any particular size for which payment will be made. Payment will not, however, be made for more than the actual weights.

7. The following descriptions of iron are to be made up in bundles not exceeding $1\frac{1}{2}$ cwt., and securely bound with $\frac{1}{4}$ -inch round iron, viz.—Rod, $\frac{3}{8}$ -inch diameter and under; square, $\frac{3}{8}$ -inch side and under; flat bars, angle, tee, and channel, not exceeding 56 lb. per length ordered; hoop, the bundles of latter to be about 8 feet long.

8. After approval in bulk, each piece of the iron is to be thoroughly cleansed from rust and dirt, and, unless otherwise ordered, coated with best boiled quickly-drying linseed oil; all

bundles and 10 per cent. of the pieces sent loose are to have the address stencilled on them in metallic paint near one end. Both ends of every piece, whether loose or in bundles, are to be painted same colour as the address for a length of 12 inches. The stencil plates must be supplied by the Contractor.

9. All iron is to bear the maker's name or brand legibly stamped.

10. Any inattention to these instructions will cause the iron to be rejected.

11. Notice in writing is to be given to the Superintendent of the India Store Depot, Belvedere Road, Lambeth, S.E., when the Contractor is ready to cut samples or to have iron examined.

12. The iron is to be delivered as provided in the Conditions of Contract, and addressed as under:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and are to be advised by a delivery note (Form 140) similarly marked.

Specification of Fire-bar Iron.

1. The iron is to be Staffordshire or Scotch, sound and cleanly rolled to the sections required and in lengths of 16 feet, unless otherwise specified in the schedule.

2. The bars must stand the following forge test when hot, viz., flattening at the end to a thickness of $\frac{1}{2}$ an inch in either direction.

3. Notice in writing is to be given to the Superintendent, India Store Depot, when the iron is ready for examination at the Contractor's works. After approval it is to be coated with boiled linseed oil.

4. Any samples that may be required are to be forwarded to the India Store Depot free of expense and no charge is to be made for them.

5. The iron is to be sent loose; 10 per cent. of the pieces are to have the address stencilled on them in metallic paint, and both ends of each piece are to be painted the same colour as the address for a length of 12 inches. The Contractor to provide the requisite stencil plates.

6. The name of the maker and the stamped on each piece.

are to be

Address:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and accompanied by a delivery note (Form 140) similarly marked.

Specification of Swedish Iron.

1. The iron is to be soft and fibrous, thoroughly well made, uniform in texture, perfectly free from lamination and all defects of manufacture, and easily weldable.

It will be subjected to the forge tests Pattern No. which can be seen at the India Store Depot.

2. The Contractor is to state on his tender the brand which he proposes to supply.

3. The Superintendent of the India Store Depot, or his deputy, will select such samples as may be necessary, at the Contractor's premises in Great Britain, and will see pieces cut from them for forge tests; these pieces will be tested at the India Store Depot, under direction of the Superintendent or his deputy.

4. Any iron not standing the specified test will be rejected.

5. The Contractor is, at his own expense, to cut and forward to the India Store Depot the samples required for testing.

6. No charge is to be made for the samples used in testing.

7. Bars, &c., are to be supplied in commercial lengths, unless otherwise specified in the Schedule, and sent loose with the exceptions mentioned in para. 8.

The weights (and lengths when stated) given in the Schedule must be adhered to as closely as possible. To make up the Schedule weights one shorter bar, &c., of each description will be accepted.

8. The following descriptions of iron are to be made up in bundles not exceeding $1\frac{1}{2}$ cwt., and securely bound with $\frac{1}{4}$ -inch round iron, viz.,—Rod, $\frac{3}{4}$ inch diameter and under; square, $\frac{1}{2}$ inch side and under; flat bars, angle, tee, and channel, not exceeding 56 lb. per length ordered; hoop, the bundles of latter to be about 8 feet long.

9. After approval in bulk, all bundles and 10 per cent. of the pieces sent loose are to have the address stencilled on them in metallic paint near one end. Both ends of every piece, whether loose or in bundles, are to be painted same colour as the address for a length of 12 inches. The stencil plates must be supplied by the Contractor.

10. All iron is to bear the maker's name or brand legibly stamped.

11. Any inattention to these instructions will cause the iron to be rejected.

12. Notice in writing is to be given to the Superintendent of the India Store Depot, Belvedere Road, Lambeth, S.E., when the Contractor is ready to cut samples or to have iron examined.

Address:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and are to be accompanied by a delivery note (Form 140) similarly marked.

INDIA STORE DEPOT.

Tests for Iron.

S=Tensile strain in tons per square inch of original section to be borne without breaking.

C=Contraction of area at point of fracture to be not less than.....per cent.

E=Elongation in a length of 8 inches to be not less than.....per cent.

Description of Iron.	Yorkshire.		B. B. S.		B. B. S.		Railway.	
	S	C	S	C	S	C	S	C
* Bars and rods, 4 square inches and under in sectional area, and hoop	23	50	24	40	23	30	24	40
† Bars and rods, above 4 and not exceeding 8 square inches in sectional area	23	45	24	30	23	25	24	30
Bars and rods, above 8 square inches, do. do.	23	40	24	25	23	20	24	25
Channel, Angle and Tee	22	45	23	35	22	25	22	25
Plates and Sheets	S	E	S	E	S	E	S	E
	21	20	22	12	20	10	21	10
Length	19	12	18	7	17	5	18	5
Cross								

* Round not exceeding $2\frac{1}{2}$ " diam.—3.976 area.

† Round above $2\frac{1}{2}$ " and not exceeding $3\frac{1}{2}$ " diam.—7.977 area.

Specification of Plate and Sheet Iron.

1. The iron is to be soft and fibrous, thoroughly well made, uniform in texture, perfectly free from lamination, buckles, blisters, and all defects of manufacture. It will be subjected to the following tests for tensile strength and elongation, as well as to the forge tests in use at the India Store Depot, where a pattern (No. 2845 for plate, 2845 A. for sheet) of the forge tests can be seen:—

Lengthways of the grain : } tons per square inch } per cent. elongation in a
Across " " : } of original section. } length of 8 inches.

In addition to the forge and machine tests, the iron is to bend cold through the following angles:—

Thickness of Plate.	With the Grain.	Across the Grain.
	Degrees.	Degrees.
1 inch and $\frac{1}{8}$ inch	15	5
" " " "	20	7 $\frac{1}{2}$
" " " "	22 $\frac{1}{2}$	10
" " " "	25	10
" " " "	27 $\frac{1}{2}$	12 $\frac{1}{2}$
" " " "	30	12 $\frac{1}{2}$
" " " "	35	15
" " " "	42 $\frac{1}{2}$	17 $\frac{1}{2}$
" " " "	50	20
" " " "	60	25
" " " "	70	30
" " " "	125	80
" " " "	130	85
$\frac{1}{8}$ inch to $\frac{1}{4}$ inch	135	90
Under $\frac{1}{8}$ inch	180	180

The inner radius of the curve at the bend not to exceed $1\frac{1}{2}$ times the thickness of the plate or sheet.

Ditto, ditto, $\frac{1}{2}$ thickness of sheet, i.e., to bend double round its own thickness.

2. The Superintendent of the India Store Depot, or his deputy, will select such samples as may be necessary, at the Contractor's works, and will see pieces cut from them 16 inches by 3 inches for machine test, and 8 inches by 6 inches for forge test.

These pieces are to be stamped with an arrow indicating the direction of the grain, and with the letters L and C respectively. They will be tested at the Contractor's works or elsewhere under direction of the Superintendent of the India Store Depot or his deputy, as may be directed at the time.

3. Any iron not standing the specified test will be rejected.

4. The Contractor is, at his own expense, to cut and forward, as may be directed by the Superintendent of the India Store Depot, the samples which have been tested at his works, or which may be required for testing elsewhere.

5. No charge is to be made for the samples used in testing, nor for any testing carried out at the Contractor's works.

6. The edges of all plates and sheets are to be cleanly sheared and truly squared to the dimensions given.

7. The weights given in the Schedule must in no case be exceeded. To make up the Schedule weights one shorter plate or sheet of each description will be accepted, except in cases where the number and dimensions of the plates, &c., are specified in addition to the weight. The Schedule weights in such cases include an allowance of 5 per cent. above "book" weights and shew the maximum weight of any particular size for which payment will be made. Payment will not, however, be made for more than the actual weights.

8. Plates and sheets above $\frac{1}{8}$ inch thickness are to be sent loose, and those of $\frac{1}{16}$ inch and under are to be made up in bundles not exceeding $1\frac{1}{2}$ cwt. each; each bundle to be securely bound with not less than four clips of $\frac{3}{4}$ inch half round iron.

9. After approval in bulk, the plates or sheets are to be thoroughly cleansed from rust and dirt, and coated with best boiled quickly drying linseed oil. All bundles and 10 per cent. of the plates or sheets sent loose are to have the address stencilled on them in metallic paint near one end, and the number and dimensions of the plates or sheets near the other end. Both ends of every plate or sheet, whether loose or in bundles, are to be painted the same colour as the address for a length of 12 inches.

(Note.—Paragraphs 8 and 9 do not apply to galvanized sheets.)

10. Stencil plates must be furnished by the Contractor.

11. Each plate or sheet is to bear the maker's name or brand legibly stamped on it.

12. Any inattention to these instructions will cause the iron to be rejected.

13. Notice in writing is to be given to the Superintendent of the India Store Depot, Belvedere Road, Lambeth, S.E., when the Contractor is ready to cut samples or to have the plates or sheets examined.

14. The iron is to be delivered as provided in the Conditions of Contract, and addressed as under:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and are to be advised by a delivery note (Form 140) similarly marked.

Specification of Chequered Iron Plates.

1. The iron is to be soft and fibrous, thoroughly well made, uniform in texture, perfectly free from lamination, buckles, blisters, and all defects of manufacture. It will be subjected to the forge tests in use at the India Store Depot, where a pattern (No. 2845 chequered) of the forge tests can be seen.

In addition to the forge tests, the iron is to bend cold through an angle of 45° with the grain without fracture. The chequering is to be well raised above the surface of the plate.

2. The Superintendent of the India Store Depot, or his Deputy, will select such samples as may be necessary at the Contractor's works, and will see pieces cut from them 8 inches by 6 inches for test.

These pieces are to be stamped with an arrow indicating the direction of the grain. They will be tested at the Contractor's works or elsewhere under direction of the Superintendent of the India Store Depot or his Deputy, as may be directed at the time.

3. Any iron not standing the specified tests will be rejected.

4. The Contractor is, at his own expense, to cut, and forward as may be directed by the Superintendent of the India Store Depot, the samples which have been tested at his works, or which may be required for testing elsewhere.

5. No charge is to be made for the samples used in testing, nor for any testing carried out at the Contractor's works.

6. The edges of all plates are to be cleanly sheared and truly squared to the dimensions given.

7. The weights given in the Schedule must in no case be exceeded. To make up the Schedule weights one shorter plate or sheet of each description will be accepted, except in cases where the number and dimensions of the plates are specified in addition to the weight. The Schedule weights in such cases include an allowance of 5 per cent. above "book" weights, and shew the maximum weight of any particular size for which payment will be made. Payment will not, however, be made for more than the actual weights.

8. The plates are to be sent loose.

9. After approval in bulk, the plates are to be thoroughly cleansed from rust and dirt and coated with best boiled quickly drying linseed oil; 10 per cent. are to have the address stencilled on them in metallic paint near one end, and the number and dimensions of the plates near the other end. Both ends of every plate are to be painted the same colour as the address for a length of 12 inches.

10. Stencil plates must be furnished by the Contractor.

11. Each plate is to bear the maker's name or brand legibly stamped on it.

12. Any inattention to these instructions will cause the iron to be rejected.

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13. Notice in writing is to be given to the Superintendent of the India Store Depot, Belvedere Road, Lambeth, S.E., when the Contractor is ready to cut samples, or to have the plates examined.

Address:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and are to be accompanied by a delivery note (Form 140) similarly marked.

Specification of Galvanized Iron Sheets, Plain and Corrugated.

1. The iron in the black or ungalvanized state is to be as described in the annexed Specification of Sheet Iron, and subject to the tests, &c., therein mentioned, and is to be of the following "book" weights per foot super., viz.—

Item 1.	Lbs. (No.	S.W.G.)
2.	" "	" "
3.	" "	" "
4.	" "	" "
5.	" "	" "
6.	" "	" "

The allowance for increase of weight by galvanizing is .15 lb. per foot super. (plain) including both sides.

The weights quoted in the schedule include an allowance of 5 per cent. above the "book" weights of iron in the black, and also the above allowance for galvanizing, and show the maximum weight of any particular size for which payment will be made. Payment will not, however, be made for more than the actual weights.

2. Each sheet is to be carefully sheared to the stipulated dimensions, thoroughly cleaned, and afterwards galvanized with best Silesian zinc.

3. Each corrugated sheet is to have
 inches in depth, to cover corrugations, inches in width
 feet inches from out to out, and feet inches, to measure
 before corrugation. The iron is to be corrugated before being galvanized in the case of sheets thicker than 20 S.W.G. in the black. Sheets not exceeding 20 S.W.G. may be corrugated after galvanizing.

4. The galvanizing is to be well executed, the sheets being drawn through flux (not sand), the surface to be perfectly clean and entirely free from black spots and blemishes.

5. Unless otherwise directed by the Superintendent, the sheets will not be finally examined and approved until three weeks after galvanizing, when any that exhibit spots or other defects will be rejected.

6. The Contractor is to give notice in writing to the Superintendent of the India Store Depot, Belvedere Road, Lambeth, S.E., when two weeks have elapsed from date of galvanizing.

7. When the sheets have been approved they are to be packed in skeleton cases, to contain about 10 cwt. each, made of sound well seasoned spruce deal, the tops, bottoms, and sides 1 inch thick, the ends 1½ inch thick, clamped at the corners with sheet iron of No. 19 "S.W.G."

8. Each case is to have clearly stencilled on it in good oil paint the address, gross and net weights, description of contents, and such shipping marks as may be required by the officers of the Department. The Contractor is to provide the necessary stencil plates.

Address:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and are to be advised by a delivery note (Form 140) similarly marked.

Dimensions of Corrugated Sheets.

CORRUGATIONS.			WIDTH.		Remarks.
Width.	Depth.	No.	To cover.	Out to out.	
2	1	12	2 0	2 1	In ordinary use.
3	1	8	2 0	2 2½	
3	1	9	2 3	2 5½	
3	1	10	2 6	2 8½	Extra sizes.
3	1	11	2 9	3 1½	
3	1	12	3 0	3 2½	
4	1	6	2 0	2 2½	Extra sizes.
4	1	7	2 4	2 6½	
4	1	8	2 8	2 10½	
4	1	9	3 0	3 2½	Extra size.
4	1	5	2 1	2 8½	
5	1	6	2 6	3 1½	
5	1	7	2 11	3 4	In ordinary use.
5	1½	6	2 1	2 4	
5	1½	6	2 6	2 9	
5	1½	7	2 11	3 2	Extra sizes.
5	1½	7	2 11	3 2	

Length, 7 to 8 feet.

Specification of Wrought-iron welded Tubing and Fittings for the same.

1. The iron of which the tubes are made is to be soft, fibrous, thoroughly well made uniform in texture, and perfectly free from lamination, buckles, blisters, and all defects of manufacture. It will be subjected to the forge tests in use at the India Store Depot, where a pattern (2845) of them can be seen.

2. Notice, in writing, is to be given to the Superintendent when the Contractor is ready to have the iron examined and tested at his works. The tested samples are to be forwarded to the India Office Depot free of expense, and no charge is to be made for them. Samples, 6 inches long, of the screwed tubes and sockets proposed to be supplied are to be forwarded for approval at the same time.

3. The manufacture of bulk is not to be proceeded with till the Superintendent has approved the above samples in writing.

4. The tubes and fittings are to be supplied of the lengths, numbers, and sizes detailed in the schedule. Each straight length, short piece, or bend, is to be provided with socket at one end. The whole are to be screwed at both ends to the standard gas threads.

5. The whole of the tubes and fittings are to be tested at the Contractors' works, in Great Britain, by hydraulic pressure, to lbs. per square inch, in the presence of the Superintendent of the India Store Depot, or his Deputy, and any which show any sign of failure will be rejected. The Contractor is to provide the necessary apparatus and carry out the testing at his own expense. The mark is to be stamped on each length, socket, or fitting approved.

6. After approval the tubes and fittings (except those ordered "galvanized") are to be thoroughly cleansed from rust and dirt and coated with boiled linseed oil, which is to be allowed to dry before packing.

7. After approval in the black, the tubes and fittings ordered "galvanized" are to be smoothly and evenly galvanized with best Silesian zinc containing not more than 2½ per cent. of impurities. Samples of the zinc will be taken, if considered necessary, for analysis, and if found to be inferior to the above specification the galvanized tubes, &c., will be rejected. The threads are to be cleaned from any excess of zinc immediately after being galvanized, and care is to be taken that they are not injured.

Packing.

8. Straight tubes of not less than 1½ inch internal diameter are to be sent loose. Those of less internal diameter are to be packed in bundles.

The threads of every tube, whether loose or in bundles, are to be protected at one end with the socket, and at the other with a wrought-iron ring (galvanized, if the tubes are galvanized). Any threads left exposed are to be protected with spun yarn (soaked in linseed oil for tubes not galvanized) securely wrapped round them and tied on.

9. The bends and fittings are to be carefully packed in cases made in accordance with the annexed Specification of packing cases, and addressed as therein directed.

Marking.

10. All bundles, and 10 per cent. of the tubes sent loose, are to have the address and such shipping marks, as may be required by the Superintendent, India Store Depot, stencilled on them in good oil paint. The Contractor is to provide the necessary stencil plates.

Address:—

Samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and are to be advised by a Delivery Note (Form No. 140) similarly marked.

Specification of Bolts and Nuts.

1. The iron used for the bolts and nuts is to be free from laminations or other defects of manufacture, and must be of such strength and quality that it shall be equal to an ultimate tensile strain of not less than 24 tons per square inch of original section, with a contraction of area at the point of fracture of not less than 40 per cent. It must also stand the forge tests in use at the India Store Depot, Pattern Nos. 2846 and 2842 (ram's horn and punching).

2. The bolts are to be made out of rods, the heads being concentric and forged out of the solid. The heads and nuts are to be hexagonal, unless otherwise described in the Schedule, and are to fit so tight that they cannot be easily turned by hand; they are to be made to Whitworth's standard gauges. The threads are to be cut to Whitworth's standard pitch, and to hold full to three diameters of the bolt in all sizes that will admit of it.

3. The bolts before screwing are to stand the following tests:—

(a) Bending hot and cold without fracture through an angle of 180°.

(b) Flattening of the head while hot without cracking at the edges. The head to be flattened until its diameter is two and a half times that of the shank.

(c) The shank to be nicked on one side and bent over to show the quality of the iron.

4. The mark is to be stamped (raised or sunk) on the heads of the bolts and on one side of each nut.

5. Such bolts and nuts as are ordered "galvanized" are to be galvanized with the best Silesian spelter, containing not more than 2½ per cent. of impurities. The threads of the bolts are to be cleaned out by means of a revolving brush immediately after being galvanized; the nut on each bolt is then to be run up the full length of the thread on the bolt and back again to the point, and must then fit so tightly on every part of the thread that they cannot be easily turned by hand. Any bolts which have to be re-screwed after galvanizing must be re-galvanized, the threads cleaned out, and the nuts run up as before.

6. Notice in writing is to be given to the Superintendent, India Store Depot, when the iron is ready for examination, and also when the nuts and bolts are manufactured.

7. Three sample bolts (in the black, before screwing) of each diameter are to be forwarded to the Superintendent, India Store Depot, for approval before the manufacture of bulk is proceeded with. One complete sample of each size is also to be forwarded to the Depot after screwing (and galvanizing, if ordered).

8. After approval the black bolts and nuts are to be coated with boiled linseed oil, and packed by sizes in strong petroleum casks in bags of about 1 cwt. net. Each item of the Schedule constitutes a size.

9. The address, description of contents, gross and net weights, and such shipping marks as may be required by the Superintendent, India Store Depot, are to be stencilled in good oil paint on each cask. Stencil plates are to be provided by the Contractor.

Address:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and are to be advised by a delivery note (Form 140) similarly marked.

Specification for Short Link Chain.

All services except Marine.

1. The iron from which the chain is to be made is to be of the description known as "puddled," and of the best smithing quality; when nicked and broken it is to shew a good fibre throughout, and is to be of such strength that it shall be equal to a tensile strain of 23 tons per square inch with a reduction of area of not less than 50 per cent, and an elongation of 20 per cent. in a length of 10 inches; it must also stand the forge tests in use at the India Store Depot, viz., ram's horn, punching (diameter of punch=1½ diameter of iron), and bending cold through 180 degrees.

2. The Contractor is to give notice to the Superintendent, India Store Depot, when the iron is ready at the works, in order that the Superintendent or his Deputy may attend to see three samples for testing cut from each size; each sample to be not less than 16 inches long. The Contractor is to cut and forward these samples at his own expense to the Superintendent, India Store Depot, or to any other person whom the Superintendent may appoint. At the time that the samples are taken the Contractor is to produce for inspection the invoices of the iron, together with a certificate from the maker that it is puddled bar.

No charge is to be made for these samples, nor for any samples of chain taken for testing. No iron is to be used till the Contractor has received notice in writing from the Superintendent, India Store Depot, that it has been approved.

3. Sample links shewing the shape for each size and description of chain must be submitted to the Superintendent, India Store Depot, for approval, and manufacture must not be proceeded with till they have been approved. The links must not exceed 4½ diameters of the iron in length and 3½ diameters in width across the centre.

4. Each size of chain must agree with the particulars given in the following table:—

Diameter of Iron.	Average Weight per Fathom.	Proof Strain.	Load on Test, Piece.	Elongation of Test Piece on 36 inches.
Inches.	Lbs.	Tons.	Tons.	Inches.
1	1	1½	1½	6
1½	2½	2½	2½	7
2	4½	4½	4½	8½
2½	6½	6½	6½	9½
3	9	9	9	10½
3½	12	12	12	11½
4	16	16	16	12½
4½	20	20	20	13½
5	25	25	25	14½
5½	29	29	29	15½
6	35½	35½	35½	16½
6½	41	41	41	17½
7	49	49	49	18½
7½	54	54	54	19½
8	62	62	62	20½
8½	75	75	75	21½
9	86	86	86	22½
9½	95	95	95	23½
10	112	112	112	24½
10½	135	135	135	25½

5. On receipt of approval of samples of iron and of shapes of links, the Contractor is to inform the Superintendent when and where the manufacture of the chain will commence, in order that the Superintendent or his Deputy may attend to watch manufacture, and take such samples of chain as may be considered necessary from the men at the fires for testing to destruction in the machine at the Contractor's works.

6. The workmanship throughout must be of the best quality. All welds are to be scarfed and doliied. In chains under 3 inch the points of the links are to be crossed, welded, and doliied. The difference between the link at the weld and the ordinary section of the iron from which the link was made, in each description of chain, must not exceed one per cent. in diameter.

7. After each length of chain has been made, a piece prepared as described in clause 8, is to be cut from whatever part of it the Superintendent or his Deputy may direct, and forwarded at the Contractor's expense, to the Superintendent of the India Store Depot, Belvedere Road, Lambeth, S.E., for testing to destruction. These pieces will first be subjected to the proof strains, and then tested with the loads shewn in the fourth columns of the table in paragraph 4, in measuring the elongations under the test loads no account will be taken of any extension that may have previously taken place under proof strain. Each length of chain is to be made too long in the first instance by as much as will supply the pieces, so that one weld only may be

2. The rivets ordered "galvanized" are to be galvanized with Silesian spelter containing not more than $2\frac{1}{2}$ per cent. of impurities.
3. The rivets are to stand the following forge tests :—
 - (a) Bending hot and cold without fracture through an angle of 180° .
 - (b) Flattening of the rivet head, while hot, without cracking at the edges. The head to be flattened until its diameter is two and a half times the diameter of the shank.
 - (c) The shank of the rivet to be nicked on one side and bent over to show the quality of the material.
4. The mark is to be stamped (raised or sunk) on the heads of the rivets.
5. Notice in writing to be given the Superintendent, India Store Depot, when the iron is ready for examination, and also when the rivets are manufactured.
6. Three samples of rivets of each diameter are to be forwarded to the Superintendent, India Store Depot, for approval before the manufacture of bulk is proceeded with.
7. After approval, the whole are to be coated with boiled linseed oil (galvanized rivets excepted) and packed by sizes in strong petroleum casks in bags of 1 cwt. net. Each item of the schedule constitutes a "size."
8. The address, description of contents, gross and net weights, and such shipping marks as may be required by the Superintendent, India Store Depot, to be stencilled in good oil paint on each cask. Stencil plates to be provided by the Contractor.

Address :—

All samples sent to the India Store Depot are to be marked "Iron Branch," and are to be advised by a delivery note (Form 140) similarly marked.

Specification for Rivets (Yorkshire Iron).

1. The rivets are to be made of Lowmur, Bowling, or Farnley iron. The invoices of the Lowmur, Bowling, or Farnley Company are to be produced for inspection when the iron is submitted for examination, and each bar is to bear the brand, Lowmur, Bowling, or Farnley. The iron is to have an ultimate tensile strength of not less than 23 tons per square inch of original section, and 50 per cent. reduction of area at the point of fracture. It will also be subjected to the forge tests in use at the India Store Depot, viz. ram's horn and punching (diameter of punch = $1\frac{1}{4}$ diameter of iron). Pattern No. 2866.
2. The rivets are to stand the following forge tests :—
 - (a) Bending hot and cold without fracture through an angle of 180° .
 - (b) Flattening of the rivet head, while hot, without cracking at the edges. The head to be flattened until its diameter is two and a half times the diameter of the shank.
 - (c) The shank of the rivet to be nicked on one side and bent over to show the quality of the material.
3. The mark is to be stamped (raised or sunk) on the heads of the rivets.
4. Notice in writing to be given the Superintendent, India Store Depot, when the iron is ready for examination, and also when the rivets are manufactured.
5. Three samples of rivets of each diameter are to be forwarded to the Superintendent, India Store Depot, for approval before the manufacture of bulk is proceeded with.
6. After approval, the whole are to be coated with boiled linseed oil and packed by sizes in strong petroleum casks in bags of 1 cwt. net. Each item of the schedule constitutes a "size."

7. The address, description of contents, gross and net weights, and such shipping marks as may be required by the Superintendent, India Store Depot, to be stencilled in good oil paint on each cask. Stencil plates to be provided by the Contractor.

Address :—

All samples sent to the India Store Depot are to be marked "Iron Branch," and are to be advised by a delivery note (Form 140) similarly marked.

Specification of Steel.

Sizes and Quantities.

1. The sizes given must be strictly adhered to, and the quantities in no case be exceeded. To make up the weight specified, one shorter bar, &c., of each description will be accepted, unless the numbers and dimensions are stated in the Schedule, in addition to the weights, which, in such cases, include an allowance of 5 per cent. above book weights. These weights are therefore the maximum that will be paid for. Payment will not, however, be made for more than the actual weight supplied of any size.

Materials.

2. All the materials comprised in this Specification are to be the very best of their respective kinds, and free from defects and imperfections of every description. The name of the maker and the to be stamped on every piece.

Cast Steel.

3. The cast steel is to be of the very best description made from blister steel made of Swedish iron, of the Luefsta or O.O. brands, well selected, and of suitable temper for the purpose intended, and very carefully cast in small crucibles. Every bar is to be perfectly sound, free from defects, and is to be branded "Warranted Crucible Cast Steel."

Shear Steel.

4. The shear steel is to be the best warranted "double" shear steel made from O.O. blister steel, and every bar must be carefully made, so that it may be perfectly sound from end to end.

Blister Steel.

5. The blister steel is to be of the kind known under the brand O.O.

Ferrule Steel.

6. The ferrule steel is to be of the sizes specified, and made from Swedish iron, properly cemented.
7. The cast steel is to be in lengths of 10 feet, and the shear, blister, and ferrule steel in commercial lengths, unless otherwise specified.

Steel Wire.

8. The steel wire is to be made of Swedish iron properly cemented, and is to be bound up in coils not exceeding $\frac{1}{4}$ cwt. each.

Testing.

9. Samples of each kind of steel will be taken from the bulk for testing. The samples taken from the crucible cast steel will be made into tools and tested in such a manner as the Superintendent, India Store Depot, shall direct, and no steel will be accepted which, in the opinion of the Superintendent, India Store Depot, falls short of the tests and requirements of this Specification.

The manufacture of the tools, and the testing of all other descriptions of the steel, are to be carried out at the Contractor's works at his expense, and the tools and tested samples are to be forwarded free of charge to the Superintendent, India Store Depot.

* NOTE.—On account of expense (L) and O.O. are rarely specified except in the case of Railway orders.

10. The Superintendent, India Store Depot, is to have full power to subject every bar to any test or tests to determine if the steel is suitable for the purpose intended, should he deem it advisable to do so.

Oiling, Packing, and Marking.

11. All the steel of every description is to be thoroughly cleansed and then coated with the best quick drying linseed oil. The cast and shear steel and steel wire, when dry, are to be packed in cases made in accordance with the Specification of Packing Cases annexed hereto. The blister and ferrule steel, when dry, are to be packed in bundles not exceeding 2 cwt. each bound round with $\frac{3}{8}$ inch iron wire.

No case when full must weigh more than 7 cwt. Each case and bundle is to have clearly stencilled upon it in such colours as may be directed, the address and such other descriptive and shipping marks as may be required by the officers of the Department, and each of the bars packed in bundles is to have both ends painted with the same colour as the address for a length of 12 inches.

Address:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and advised by a delivery note (Form 140) similarly marked.

Specification of Bar Steel (all Sections).

1. The steel is to be thoroughly well made, uniform in texture, and free from lamination and all defects of manufacture.
2. The Superintendent of the India Store Depot, or his Deputy, will select such samples as may be necessary, at the Contractor's works, and will see pieces 16 inches in length cut from them for machine and forge tests; these pieces will be tested at the Contractor's works or elsewhere under the direction of the Superintendent or his Deputy, as may be directed at the time. The pieces are to be of parallel width for at least 8 inches of their length, and are to be turned or cut in a planing machine; those for forge tests are to have the sharp edges taken off.
3. The steel is to have an ultimate tensile strength of not less than 26 and not exceeding 30 tons per square inch of section, with a reduction of area of 40 per cent. at point of fracture.
4. Pieces heated uniformly to a low cherry red, and cooled in water of 82° Fahrenheit must stand bending in a press to a curve of which the inner radius is one and a half times the thickness of the steel tested.
5. The ductility of the bars will be ascertained by the application of one or both of these tests, or by bending them cold by the hammer.
6. Any steel not standing the specified test will be rejected.
7. The Contractor is, at his own expense, to cut and forward, as may be directed by the Superintendent, the samples which have been tested at his works, or which may be required for testing elsewhere.
8. No charge is to be made for the samples used in testing, nor for any testing carried out at the Contractor's works.
9. Bars, &c., are to be supplied in the following lengths, unless otherwise specified in the Schedule, and sent loose with the exceptions mentioned in para. 10:

Description of Steel.	Lengths.
Round—	
$\frac{1}{2}$ -inch diameter and under	Feet.
$\frac{1}{2}$ -inch to $\frac{3}{4}$ -inch diameter	14
Above $\frac{3}{4}$ -inch diameter	16
	20
Square—	
$\frac{1}{2}$ -inch side and under	
$\frac{1}{2}$ -inch to $\frac{3}{4}$ -inch side	14
Above $\frac{3}{4}$ -inch side	16
	20
Angle, tee, channel—	
$\frac{1}{2}$ -inch and under in thickness	16
Above $\frac{1}{2}$ -inch in thickness	20
Flat bars	20
Hoop	36 to 40

The weights given in the Schedule must in no case be exceeded. To make up the Schedule weights one shorter bar, &c., of each description will be accepted, unless the numbers and dimensions are stated in the Schedule, in addition to the weights. The Schedule weights in such cases include an allowance of 5 per cent. above "book" weights, and show the maximum weight of any particular size for which payment will be made. Payment will not, however, be made for more than the actual weights.

10. The following descriptions of steel are to be made up in bundles not exceeding 1½ cwt., and securely bound with $\frac{1}{4}$ -inch round iron, viz.—Round, $\frac{3}{8}$ inch diameter and under: square, $\frac{1}{4}$ inch side and under; flat bars, angle, tee, and channel, not exceeding 56lb. per length ordered; hoop, the bundles of latter to be about 8 feet long.

11. After approval in bulk, each piece of the steel is to be thoroughly cleansed from rust and dirt, and coated with boiled linseed oil; all bundles and 10 per cent. of the pieces sent loose are to have the address stencilled on them in metallic paint near one end.

Both ends of every piece, whether loose or in bundles, are to be painted same colour as the address for a length of twelve inches. The stencil plates must be supplied by the Contractor.

12. All steel is to bear the maker's name or brand legibly stamped.

13. Any inattention to these instructions will cause the steel to be rejected.

14. Notice in writing is to be given to the Superintendent of the India Store Depot, Belvedere Road, Lambeth, S.E., when the Contractor is ready to cut samples or to have steel examined.

15. The steel is to be delivered as prescribed in the Conditions of Contract and addressed as under:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and are to be accompanied by a delivery note (Form 140) similarly marked.

Specification of Steel Plates and Sheets.

1. The steel is to be made by the Siemens-Martin or open-hearth process. Steel made by the basic process will not be accepted.

2. The Superintendent of the India Store Depot, or his Deputy, will select such samples as may be necessary, at the Contractor's works, and will see pieces cut from them for machine and forge tests.

The pieces are to be 16 inches $\times$ 1½ inches and are to be stamped with an arrow, indicating the direction of the length of the plate or sheet. They will be tested at the Contractor's works or elsewhere under direction of the Superintendent of the India Store Depot, or his Deputy, as may be directed at the time.

3. Strips cut crosswise or lengthwise are to have an ultimate tensile strength of not less than 26 and not exceeding 30 tons per square inch of section, with a reduction of area of 35 per cent. at point of fracture.

For furnace and other plates exposed to flame, the ultimate tensile strength is not to exceed 26 tons per square inch, with a reduction of area of 35 per cent. at point of fracture.

4. Strips cut crosswise or lengthwise 1½ inches wide, heated uniformly to a low cherry red, and cooled in water of 82° Fahrenheit, must stand bending in a press to a curve of which the inner radius is one and a half times the thickness of the steel tested.

5. The strips are to be of parallel width for at least 8 inches of their length, and are to be cut in a planing machine; those for forge tests are to have the sharp edges taken off.

6. The ductility of every plate or sheet will be ascertained by the application of one or both of these tests to the shearings, or by bending them cold by the hammer. Any which do not stand the tests will be rejected.

7. No charge is to be made for the samples used in testing, nor for any testing carried out at the Contractor's works.

1356 P. W. D.

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8. The edges of all plates and sheets are to be cleanly sheared and truly squared to the dimensions given.

9. The weights given in the Schedule must in no case be exceeded. To make up the Schedule weights one shorter plate or sheet of each description will be accepted, except in cases where the number and dimensions of the plates, &c., are specified in addition to the weight. The Schedule weights in such cases include an allowance of 5 per cent. above "book" weights, and shew the maximum weight of any particular size for which payment will be made. Payment will not, however, be made for more than the actual weights.

10. Plates and sheets above $\frac{1}{8}$ -inch thickness are to be sent loose, those of $\frac{1}{8}$ -inch and under are to be made up in bundles not exceeding 1½-cwt. each; each bundle to be securely bound with not less than four clips of $\frac{3}{4}$ -inch half-round iron.

11. After approval in bulk, the plates or sheets are to be thoroughly cleansed from rust and dirt, and coated with best boiled quickly-drying linseed oil. All bundles and 10 per cent. of the plates or sheets sent loose are to have the address stencilled on them in metallic paint near one end, and the number and dimensions of the plates or sheets near the other end. Both ends of every plate or sheet, whether loose or in bundles, are to be painted the same colour as the address for a length of 12 inches.

12. Stencil plates must be furnished by the Contractor.

13. Each plate or sheet is to bear the maker's name or brand legibly stamped on it.

14. Any inattention to these instructions will cause the steel to be rejected.

15. Notice in writing is to be given to the Superintendent of the India Store Depot, Belvedere Road, Lambeth, S.E., when the Contractor is ready to cut samples, or to have the plates or sheets examined.

Address:—

All samples sent to the India Store Depot, Belvedere Road, Lambeth, S.E., are to be marked "Iron Branch," and are to be accompanied by a delivery note (Form 140) similarly marked.

Specification of Spring Steel.

Sizes and Quantities.

1. The sizes given must be strictly adhered to, and the quantities in no case be exceeded. To make up the weight specified, one shorter bar, &c., of each description will be accepted, unless the numbers and dimensions are stated in the Schedule, in addition to the weights which, in such cases, include an allowance of 5 per cent. above book weights. These weights are therefore the maximum that will be paid for. Payment will not, however, be made for more than the actual weight supplied of any size. The steel is to be in lengths of 15 feet, and the edges rounded, unless otherwise specified.

Materials.

2. All the materials comprised in this Specification are to be the very best of their respective kinds, and free from defects and imperfections of every description. The name of the maker and the letters " " are to be stamped on every piece.

3. The steel is to be in bars. Each end is to be nicked and broken when cold to ascertain if the temper be suitable.

The steel of which the laminated springs are made is to comply on analysis with the following conditions. Its carbon must not exceed .7 per cent., or be less than .45 per cent. Silicon, phosphorus, and sulphur must not be present in greater proportions than .06 per cent. each, and the manganese must not exceed .6 per cent. The steel of which the volute springs are made is to comply on analysis with the following conditions. Its carbon must not exceed 1 per cent. or be less than .7 per cent. Silicon, phosphorus, and sulphur must not be present in greater proportions than .06 per cent., and the manganese must not exceed .6 per cent. One piece from every 15 tons, or part of 15 tons, will be subjected to complete analysis by a metallurgist selected by the Director General of Stores. Should the analysis shew the carbon, silicon, phosphorus, or manganese in the steel to exceed the specified maximum, or should the carbon fall short of the specified minimum, the whole lot of steel from which the piece was

taken will be rejected. The Superintendent, India Store Depot, or his Deputy, shall have power to mark in some easily distinguishable manner all rejected steel, but it will not be marked in such a manner as to render it unsaleable to other parties.

Testing.

4. Samples will be taken from the bulk for testing. Bars will be selected from each size, made into springs, and when tempered will be brought down smartly several times under a steam hammer. Any spring shewing signs of injury under this test, or not returning to the camber or original height which it had previous to the test, will be rejected. No steel will be accepted which, in the opinion of the Superintendent, India Store Depot, falls short of the tests and requirements of the Specification.

The tests are to be carried out at the Contractor's works at his expense, and the tested samples are to be forwarded free of charge to the Superintendent, India Store Depot, Belvedere Road, Lambeth, S.E., marked "Iron Branch," and accompanied by a delivery note (Form 140) similarly marked.

5. The Superintendent, India Store Depot, is to have full power to subject every bar to any test or tests to determine if the steel is suitable for the purpose intended, should he deem it advisable to do so.

Oiling and Marking.

6. The steel is to be thoroughly cleansed and then coated with the best quickly drying linseed oil; when dry, it is to be packed in bundles not exceeding 2 wt. each, bound round with $\frac{1}{2}$ -inch iron wire.

Each bundle is to have clearly stencilled upon it, in such colours as may be directed, the address and such descriptive and shipping marks as may be required by the Officers of the Department, and each of the bars packed in bundles is to have both ends painted with the same colour as the address for a length of 12 inches.

Address:—

Specification of Steel Rivets.

1. The rivets are to be made of mild steel having an ultimate tensile strength of not less than 26 and not exceeding 30 tons per square inch of section, with a reduction of area of 40 per cent. at the point of fracture. The invoices for the steel are to be produced for inspection when the steel is submitted for examination, and each bar is to bear the brand of the maker.

2. The rivets are to stand the following forge tests:—

- Bending hot and cold, without fracture, through an angle of 180°.
- Flattening of the rivet-head while hot without cracking at the edges. The head to be flattened until its diameter is two and a half times that of the shank.
- The shank of the rivet to be nicked on one side and bent over to show the quality of the steel.

3. The mark is to be stamped (raised or sunk) on the heads of the rivets.

4. Notice in writing to be given the Superintendent, India Store Depot, when the steel is ready for examination, and also when the rivets are manufactured.

5. Three samples of rivets of each diameter are to be forwarded to the Superintendent, India Store Depot, for approval before the manufacture of bulk is proceeded with.

6. After approval, the whole are to be coated with boiled linseed oil and packed by sizes in strong petroleum casks in bags of net. Each item of the schedule constitutes a "size."

Address :—

communicated to the
Consulting Engineer for Railways
for information and guidance
in continuation of Prof. No. 3442,
dated 12th March 1896.

True Extract

Monter

L. Hall, Jr.

Off: J. & Secy. to Gov. of N. H. D. J. B. B.

26

The Lang: Cnfr: for Ryp:

Схвату: Р. асст.

v. do - J. H. Aceto

do - East Coast Ry. acct.
Secretary to Government

Chief Engineer, G. W. D. v.

Chief Engineer for Brigades

PUBLIC WORKS DEPARTMENT.

OFFICE NOTE.

From

To

G.O. 632 R of 7 March 91
attached.

Please frame for
submission to the Code
Committee, the requisite
standing order to the Code.

SVB

7-3-50

bw

✓
M.L. 3579

1859/2539

To W.

The rules regarding the preparation in India of indents for iron and steel have been already embodied in the Madras Code, please see Appendix G. paras 39 - 42 introduced by standing order No. 1395; but the specifications do not seem to be matter for insertion (in detail at any rate) in the Code. The proper place would seem to be the book of standard specifications, with which I have nothing to do. If any reference to the specifications in the code is considered necessary, it should apparently be limited to a rule, that in preparing indents the specifications, to be found somewhere, should be attended to; but unless I know what will be done with the specifications I do not know what to say about them, and in any case it will be convenient if you would say exactly what you want, or if you would yourself draft the required standing order.

W.C.

C.

M.L.
31/3/91
D. 29/3
(Enc. one)

936/12

3579

For indents, with reference to the specifications, which will be printed as an appendix to the Standard Specifications, or whether it will be sufficient to contain the G.O. Circular to all Agents of the Dept. by a G.O.

If the latter plan be adopted, it will be necessary to write to India for more copies of the circular.

Code S.O. No. 1395 to which have been added to the effect that the specifications are embodied in S.O. No. 31.3.91

Now these circulars
No 2 R₂ of 15th Feb. 1890
disposed of. It
is referred to in
para 39 of
Appendix 9 -

I think all that
is required is to
substitute 10th of
Feb 91 for 15th
Feb 90 in the
side note to
para 39

Over

14/3/91

Out

Circular No 2 R₂
of 15-2-90 was disposed
of in the Railway
Circular No 80. No

No R & 12.3.90 -

It was not com-
municated to the
Board, & consequently
not to officers of the
dept. Generally, so
that the side note

936/13

to para 39 in S.O. No
1395 must be omitted,
reference to Sup^y of 82.
Given -

The "suggestions"
in the two circulars
are identical except
that in the later circular
a remark has been
inserted in the side-
note giving limits of
dimensions for plates.
The earlier circular
does not contain the
remark.

The specifications
in the later circular
are more elaborate
than those in the first.

If it be desired
to refer to Circular
No 2 R₂ of 15-2-91
in the side note to
the S.O., it will
be necessary to
communicate the
circular to officers of
the dept. for their

purpose it will be
necessary to apply to
India for extra spare
copies, those already
received having been
used up by the Ry.
Branch.

C.
2-4-91

I think that they
should be communicated
Spare copies can
be applied for &
then the duplicates
inserted by S.O.

oak
2-4-91

No. 936 W. of H. April 1891
P. W. D.

936
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To the Secy to the S. & D.
P.W.D.

Sir,

I am directed to
request that Govt. Order
Circular No. 2 Ry. dated
10. July 1891 may be
communicated to this
Dept. in the General
Branch, & that 80 spare
copies may be forwarded
for general distribution.
The 36 spare copies ad-
dressed to the Railway
Branch have been
distributed in that
Branch.

2. I am to state
this opportunity to re-
quest that G. of S.
Circulars which are
applicable to all
branches of the P.W.
Dept. may be
addressed to the

Secretary in this Dept.
who will make the
necessary distribution
to branches. The prac-
tice of addressing such
papers to Joint Secretaries
leads to inconvenience
in their disposal - thus,
the Circular from the
Govt. India No 2 Rg
of 13th July 1890 which
was addressed to the
Joint Secretary, Punjab
Branch has only now
come to notice in the
General Branch. on
receipt of the Circular
of 10th July 1891.

Heard

1891

5/4/91

Ch. J. H.

4/4/91

(14)

12/2/91
2/7/91