PRB. 178 (N)
16,000

INDIAN RAILWAYS

SCHEDULE OF DIMENSIONS

3ft.–3⅜ in. GAUGE, 1930

(Printed in Metric Units 1965)

Inland : Rs. 1.50 P.
Foreign : 4 Sh. 3 d. or
60 cents.

PRB. 178 (N)
10,000.

INDIAN RAILWAYS

SCHEDULE OF DIMENSIONS

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3 Ft.–3 3/8 In. GAUGE. 1930

(*Printed in Metric Units* 1963)

(*For General Distribution*)

GOVERNMENT OF INDIA

MINISTRY OF RAILWAYS

(RAILWAY BOARD)

Circular No. 61/*WDO/SD*/18.

New Delhi, dated the February, 1962.

To

The General Managers,
Central, Eastern, Northern, North-Eastern, Northeast Frontier, Southern, South-Eastern and Western Railways.

The General Manager, Chittaranjan Locomotive Works.

The Chief Administrative Officer, Integral Coach Factory, Perambur, Madras.

Messrs. Martin & Company, Managing Agents, Arrah-Sasaram, Bukhtiarpur-Bihar, Howrah-Amta, Howrah-Sheakhala, Futwa-Islampur and Shahdra (Delhi)

Saharanpur Light Railways, Mercantile Building, Calcutta.

Messrs. McLeod and Company, Managing Agents, Burdwan-Katwa, Bankura-Damodar River and Ahmadpur-Kutwa Railways.

Messrs. Dalmia Jain and Company, Managing Agents, Dehri-Rohtas Light Railways, Dalmia Nagar, Bihar.

The Commissioner of Railway Safety, Ministry of Communication, Simla-3.

The Addl. Commissioner of Railway Safety, (Calcutta), 6 Dacres Lane, Calcutta.

The Addl. Commissioner of Railway Safety, Construction Circle, Calcutta.

The Addl. Commissioner of Railway Safety (Lucknow), 6, Esplanade East, Calcutta.

The Addl. Commissioner of Railway Safety, Bangalore.

The Addl. Commissioner of Railway Safety, Queens Road, Bombay.

Revised Schedule of Dimensions, Metre Gauge

DEAR SIR,
DEAR SIRS,

I am directed to forward herewith a revised Schedule of Maximum and Minimum Dimensions to be observed on M.G. Railways in India. It will be known as the "Metric Schedule of Dimensions, Metre Gauge 1961". In this Schedule the provisions made in the Schedule of Dimensions, Metre Gauge 1930 have been converted to Metric Units with certain minor changes as a result. This Schedule will supersede all former Schedules.

The 1922 Schedule was divided into two distinct parts: (*i*) the Maximum and Minimum Dimensions to be observed on all Railways unless the sanction of the Railway Board had been obtained to depart therefrom, and (*ii*) the Recommended Dimensions to be used as far as practicable for all new works and alterations. These Recommended Dimensions were

practically the B.G. Dimensions, in order to provide in the future for possible conversion of the M.G. to B.G.

When the 1922 Schedule was revised in 1930 it was considered unnecessary to include these Recommended Dimensions. It was provided that wherever it is possible to do so without extra expense or inconvenience the minima clearances prescribed for the B.G. should be observed and on M.G. Railways where conversion to B.G. is at all probable the B.G. minima clearances should be worked to even if it involves extra expense; the amount of extra expense warrantable to be decided on the merits of the case. The Schedule of 1930 was therefore rearranged on different lines; and divided in fact into three separate Schedules.

Schedule I, entitled "Standard Dimensions", is to be used on all new works or alterations to existing works unless prior sanction to infringe any dimension contained therein has been obtained from the Railway Board, through the Additional Commissioner of Railway Safety of the Circle.

Schedule II, entitled "Recommended Dimensions", represents what is generally considered good practice, which it is desirable but not compulsory to work to, and sanction to infringe which is not required. It is to be noted, therefore that the term "Recommended Dimensions" in the 1930 Schedule has a meaning quite different from the meaning in 1922 Schedule.

Schedule III, shows some departures from the Standard Dimensions which may be permitted to continue on existing Railways, but must not be used in new works or alterations. It will be noted that they are given in the form of clearances between structures and the rolling stock in use on the particular Railway, which rolling stock may be smaller than the largest stock sanctioned generally on M.G. Railways. Therefore, before advantage is taken of this Schedule, the maximum size of the rolling stock permissible on the particular Railway or Section of Railway must be fixed, and recorded in a Diagram; and steps must be taken to prevent any larger rolling stock running over the section of line concerned. Applications to the Additional Commissioner of Railway Safety to use the clearances in Schedule III must,

therefore, be accompanied by a certified diagram of the maximum dimensions of the rolling stock to be permitted on the section. Such application need not be submitted to the Railway Board.

The Schedule of Dimensions, with metric and F.P.S. dimensions which is now forwarded with this letter has been based on the 1957 reprint of 1930 Schedule and modified in accordance with Correction Slip No. 1 to 1957 Edition, with the difference that Chapter IV of Schedule I has been rearranged under two headings, namely Chapter IV(a) for Carriage and Wagon and Chapter IV(b) for Locomotives. In converting F.P.S. dimensions into metric, the smaller dimensions less than 12 inches have been rounded off to the nearest millimetre, those of fixed structures and profile of rolling stock to nearest 5 mm. and other longer dimensions to nearest cm. or metre depending on the accuracy required.

This Schedule includes the requirements for 25 kV. A.C. Traction. These dimensions are however to be adopted only where it is considered that A.C. Electric Traction is likely to be introduced.

Requisition for additional copies of this Schedule, should be sent to the Manager of Publications, Civil Lines, Delhi.

Yours faithfully,
(V. Venkataramayya)
Director, Civil Engineering,
Railway Board.

No. 61/*WDO*/*SD*/18.

New Delhi, dated the February, 1962.

A copy of the foregoing letter and enclosure is forwarded for information to :—

The Chief Secretary to the Govt. of Madras, Public Works Department.

The Chief Secretary to the Govt. of Maharashtra, Public Works Department.

The Chief Secretary to the Govt. of Gujarat, Public Works Department.

The Chief Secretary to the Govt. of West Bengal, Communications and Works Department, Railway Branch.

The Chief Secretary to the Govt. of Uttar Pradesh, Public Works Department.

The Chief Secretary to the Govt. of Punjab (India), Public Works Department, Buildings and Roads Branch.

The Chief Secretary to the Govt. of Bihar, Public Works Department, Railway Branch.

The Chief Secretary to the Govt. of Orissa, Public Works Department, Railway Branch.

The Chief Secretary to the Govt. of Madhya Pradesh, Public Works Department.

The Chief Secretary to the Govt. of Assam, Public Works Department.

The Chief Secretary to the Govt. of Andhra Pradesh.

The Chief Secretary to the Govt. of Jammu & Kashmir.

The Chief Secretary to the Govt. of Kerala.

The Chief Secretary to the Govt. of Mysore.

The Chief Secretary to the Govt. of Rajasthan.

The Director General of Posts and Telegraphs.

The Chief Mining Engineer, Ministry of Production, 1, Council House Street, Calcutta.

The Superintendent of Local Manufactures and Govt. Test House, Calcutta.

The Controller of Inspection (Metallurgical), Ministry of C. & I.

Metallurgical Inspectorate, Inspection Branch, Tatanagar (Orissa).

The Secretaries, Madras, Bombay and Calcutta Port Trust Railways.

The General Secretary, Indian Railway Conference Association, New Delhi.

The Director General of Commerce and Industry.

Principal, Staff College, Baroda.

Principal, Advanced P. Way Training School, Poona.

The Director Research, Railway Testing and Research Centre, Alambagh, Lucknow.

The Director General, R.D.S.O., Simla.

By Order,

(V. Venkataramayya)
Director, Civil Engineering,
Railway Board.

Chapter I—General

SCHEDULE I.

STANDARD DIMENSIONS

Metre Gauge.

CHAPTER I.—GENERAL

(See *Diagram* 1 *and* 1 *Modified*)

Spacing of tracks—

1.	Minimum distance centre to centre of tracks	3 660 mm. (12 ft. 0 in.)

NOTE.—(*a*) *See* Appendix for extra clearance required on curves.

Curves—

2.	Minimum Radius of curve . .	109 metres (358 ft.)

NOTE.—For relation of speed to curvature *see* item 7-R of Chapter IR and Appendix.

Bridges—

3.	Bridges must conform to the requirements of Chapter VII of the Rules for the opening	

Chapter I—General

of a Railway or section of a Railway for the Public Carriage of Passengers.

NOTE.—(*a*) On bridges when there is no flooring or when the flooring would not give continuous and substantial support throughout the bridge to the wheel of a derailed vehicle up to a distance of 840 mm. (2 ft. 9 in.) from the centre line, substantial transverse timbers should be provided and these should not be spaced with an interval between them, edge to edge, of more than 305 mm. (12 in.).

(*b*) Bridge timbers resting directly on longitudinal girders are not to be less than 127 mm. (5 in.) deep exclusive of any notching which may be required to allow for cover plates, camber, etc., and not less than 305 mm. (1 foot) greater in length than the distance, outside to outside of the girder flanges, subject to a minimum of 1 675 mm. (5 ft. 6 in.).

The minimum length of steel sleepers should be the distance outside to outside of girder flanges subject to a minimum of 1 675 mm. (5 ft. 6 in.).

(*c*) When there is adequate support for a derailed wheel between any two sleepers, for example, where there is a cross girder between two sleepers, the spacing of the sleepers centre to centre may be increased to 760 mm. (2 ft. 6 in.) maximum.

Chapter I—General

Rails—

4. Minimum clearance of check rails for a curve.	41 mm. (1·5/8 in.)

NOTE.—(*a*) This clearance must be increased by not less than half the amount of any difference between 1 metre (3 ft. 3·3/8 in.) and the gauge to which the curve is actually laid.

(*b*) Check rails are to be provided in curves where the radius is 125 metres (409 ft.) or less. They may be necessary also in the case of flatter curves at the bottom of long or steep grades, over viaducts, at dangerous hill sides or if high speed is contemplated.

5. (*i*) Minimum clearance of check rail at a level crossing .	51 mm. (2 in.)
(*ii*) Maximum clearance of check rail at a level crossing .	57 mm. (2·1/4 in.)
6. Minimum depth of space for wheel flange from rail level . .	35 mm. ($1\frac{3}{8}$ in.)

Chapter I—General

Buildings and Structures—

(See *Diagram No.* 1).

7. Minimum horizontal distance for centre of track to any structure from rail level to 305 mm. (1 foot) above rail level . .	1 370 mm. (4 ft. 6 in.)
8. Minimum horizontal distance from centre line of track to any structure except a platform from 305 mm. (1 foot) above rail level to 3 200 mm. (10 ft. 6 in.) above rail level . . .	1 905 mm. (6 ft. 3 in.)

NOTE.—(*a*) Under items 7 and 8 any material attacked by the side of a line is to be considered a structure in the sense in which the word is here used. Items 7 and 8 also apply to projections of rock, etc. from the side of a cutting.

(*b*) *See* Appendix for extra clearance required on curves.

Chapter I—General

9.	Minimum horizontal distance of any telegraph post, measured from the centre of, and at right angles to the nearest track.	The height of the post plus 1 980 mm. (6 ft. 6 in.)

NOTE.—(*a*) When the line is in cutting, a telegraph post erected outside the cutting must be at a distance from the edge of the cutting not less than the total height of the post.

(*b*) Post carrying signal or communication wires may, with the sanction of the Railway Administration, be located in accordance with item 11 (*iii*) provided that the conditions of that rule are ensured by adequate construction and strong guying or other methods.

(*c*) A telegraph post, may, with the sanction of the Railway Administration, be erected at a distance of not less than 2 745 mm. (9 ft.) clear from the centre line of the nearest track of railway, provided that it is strongly stayed or tied back on the side away from the railway.

10.	Minimum height above rail level at centre of track for overhead structures . . .	3 810 mm. (12 ft. 6 in.)

Chapter I—General

(*i*) Where D. C. electric traction is in use or is likely to be used in the future, the minimum height above rail level for a distance of 1 220 mm. (4 ft.) on either side of the centre of track shall be . . .	4 190 mm. (13 ft. 9 in.)
(*ii*) Where 25 kV. A.C. traction is likely to be used, the minimum height above rail level for a distance of 1·6 m. (5 ft. 3 in.) on either side of centre of track for:—	
(*a*) Light over-head structure such as foot over bridge . .	6·25 m. (20 ft. 6 in.)

Chapter I—General

(*b*)	Heavy over-head structure such as fly over-bridge .	5·41 m. (17 ft. 9 in.)

NOTE.—(*a*) *See* Appendix for extra clearance required on curves.

(*b*) In case of existing structures a special study shall be made as indicated in Appendix A to Chapter V-A before 25 kV. A.C. traction is introduced.

(*c*) If any turnout or cross over is located under a structure or within 15 m. (49 ft.) from its centre, the minimum height shall be 5·87 m. (19 ft. 3 in.).

11 (*i*) Minimum height above rail level of the lowest portion of any conductor crossing a railway, other than telegraph, telephone and other such low tension wires or a traction trolley wire, under conditions of maximum sag shall be —

Chapter I—General

		Up to and including 650 Volts	Above 650 Volts up to and including 33,000 Volts	Above 33,000 Volts up to and including 66,000 Volts	Above 66,000 Volts up to and including 110,000 Volts	Above 110,000 Volts up to and including 165,000 Volts	Above 165,000 Volts
Outside Station Limits		6 100 mm. (20′—0″)	6 400 mm. (21′—0″)	6 710 mm. (22′—0″)	7 010 mm. (23′—0″)	7 320 mm. (24′—0″)	7 620 mm. (25′—0″)
Inside Station Limits	UNEARTHED NEUTRAL	8 310 mm. (27′—3″)	8 840 mm. (29′—0″)	9 140 mm. (30′—0″)	9 450 mm. (31′—0″)	9 750 mm. (32′—0″)	10 060 mm. (33′—0″)
	EARTHED NEUTRAL	6 100 mm. (20′—0″)	8 840 mm. (29′—0″)	9 140 mm. (30′—0″)	9 450 mm. (31′—0″)	9 750 mm. (32′—0″)	10 060 mm. (33′—0″)

Chapter I—General

(*ii*)	Minimum height above rail level to the lowest wire of any portion of a guard or guard cradle under conditions of maximum sag . .	6 100 mm. (20 ft. 0 in.)
(*iii*)	Minimum clearance between any supporting structure forming part of a crossing or its foundation measured horizontally and at right angles to the track from the centre of the nearest track . . .	2 055 mm. (6 ft. 9 in.)
(*iv*)	Minimum horizontal distance measured at right angles to and from the	

Chapter I—General

	centre of the nearest track to any part of a rigid and well-founded post, its fittings and projections, carrying electrical conductors:—	
(*a*)	from rail level to 305 mm. (1 ft. 0 in.) above rail level . . .	1 370 mm. (4 ft. 6 in.)
(*b*)	from 305 mm. (1 ft. 0 in.) above rail level to 3 200 mm. (10 ft. 6 in.) above rail level .	1 905 mm. (6 ft. 3 in.)

NOTE.—(*a*) Any post which is so constructed or guyed as to remain in a vertical position or, failing this, to continue to provide the clearances specified above, with one or all of the conductors broken or, with its conductors attached, when subjected to maximum wind pressures may be considered to be a "Rigid and well-founded post".

Chapter I—General

(*b*) *See* Appendix for extra clearance required on curves.

(*v*) Minimum clearance between any conductor not adequately insulated and any railway structure under most adverse conditions :—	
Up to and including 650 Volts . .	2 440 mm. (8 ft. 0 in.)
Above 650 Volts up to and including 33,000 Volts . . .	2 900 mm. (9 ft. 6 in.)
Above 33,000 Volts up to and including 66,000 Volts . .	3 200 mm. (10 ft. 6 in.)
Above 66,000 Volts up to and including 110,000 Volts . .	3 510 mm. (11 ft. 6 in.)

Chapter I—General

Above 110,000 Volts up to and including 165,000 Volts . .	3 810 mm. (12 ft. 6 in.)
Above 165,000 Volts .	4 110 mm. (13 ft. 6 in.)

(*vi*) Minimum height above rail level for telegraph, telephone and other such low tension wires crossing a railway . . 6 100 mm. (20 ft. 0 in.)

Interlocking and Signal Gear—

12. Maximum height above rail level of any part of interlocking or signal gear for a width of 1 320 mm. (4 ft. 4 in.) on either side of centre of track (subject to the restriction

Chapter I—General

embodied in Note (*a*) below) . . .	25 mm. (1 in.)

NOTE.—(*a*) For a distance of 203 mm. (8 in.) outside and 127 mm. (5 in.) inside the gauge faces of the rail, no gear or track fittings must project above rail level except such parts as are required to be actuated by the wheels or wing rails and point rails of special crossings leading to snag dead-ends.

(*b*) Signal wires or supports for signal wires may be allowed at not less than 1 320 mm. (4 ft. 4 in.) on either side of centre of track provided that they are not more than 203 mm. (8 in.) above rail level.

(*c*) Metal covers with ramps on both sides must be provided over all interlocking gear projecting above rail level between the rails of a track to prevent hanging couplings from damaging the gear.

Tunnels and Bridges—(See *Diagram No.* 1)

13. Minimum horizontal clearance from centre of track from 305 mm. (1 ft.) above rail level, rising to 685 mm. (2 ft. 3 in.) above rail level.	1 370 mm. (4 ft. 6 in.) increasing to 1 905 mm. (6 ft. 3 in.)

Chapter I—General

NOTE.—(*a*) *See* Appendix for extra clearance required on curves.

(*b*) The minimum section for short tunnels may conform to the dimensions for fixed structures, Diagram 1 or in extreme cases to Schedule III, *vide* Diagram 3. If the tunnel is a long one sufficient extra section must be provided as is necessary for ventilation, and for the possibility of the alignment of the track shifting. The tunnel section shown on diagram 3, which is for Broad Gauge dimensions, should be used for new tunnels where there is a possibility of future conversion to Broad Gauge.

(*c*) Bridges and tunnels when rebuilt should be to the recommended dimensions shown in Diagram No. 2A (Revised) and 2A (revised) Modified.

Safety Refuges—

14. Maximum distance apart of refuges in tunnels . . .	100 metres (300 ft.)
15. Maximum distance apart of trolley refuges—	
(*i*) on bridges with main spans of less	

Chapter I—General

	than 100 metres (300 ft.) . .	100 metres (300 ft.)
'(*ii*)	on bridges with main spans of 100 metres (300 ft.) or more . .	a refuge over each pier.
(*iii*)	on ballasted deck bridges . .	50 metres (160 ft.)

CHAPTER II—STATION YARDS

(See Diagram No. 2)

NOTE.—The expressions "in stations" and "out of stations" are to be interpreted in accordance with the definition of "station limits" given in Chapter I, Part I, of the General Rules for Open Lines, *viz.*, "station limits" means the portion of a railway which is under the control of a Station Master and is situated between the outermost signals of the station.

Spacing of Tracks—

1 (*i*)	Minimum distance centre to centre of track between a passenger line and a line adjacent to a passenger line .	4 265 mm. (14 ft. 0 in.)
(*ii*)	For lines which are not passenger lines	3 810 mm. (12 ft. 6 in.)

NOTE.—*See* Appendix for extra clearance required on curves.

2.	Maximum gradient in station yards unless special safety devices are adopted and/or	

Chapter II—Station Yards

special rules enforced to prevent accidents in accordance with approved special instructions .	1 in 400.

NOTE.—(*a*) For the purpose of the above rule a station yard will be taken to extend—

(*i*) On single line to a distance of 46 metres (150 feet) beyond outermost points at either end of the station.

(*ii*) On double line from home signal to last stop signal of each line.

(*b*) No station yard should be constructed nor should any siding join a passenger line on a steeper grade than 1 in 260, except where it is unavoidable and then only with the previous sanction of the Railway Board obtained through the Government Inspector, when a slip siding or other arrangement is made sufficient to prevent accidents.

(*c*) Except in Hump or Gravity yards or as provided for in item 22 of this Chapter, there must be no change of grade within 15 metres (50 ft.) of any points or crossings.

Platforms—

3. Horizontal distance from centre of track	

Chapter II—Station Yards

to face of any platform wall or coping .	1 345 mm. (4 ft. 5 in.)

NOTE.—(*a*) A tolerance of 3 mm. (1/8 in.) and 6 mm. (1/4 in.) is permissible on the above dimensions.

(*b*) *See* Appendix for extra clearances required on curves.

4. Minimum height above rail level for a high passenger platform .	305 mm. (1 ft. 0 in.)
5. Maximum height above rail level for any passenger platform . . .	405 mm. (1 ft. 4 in.)
6. Maximum height above rail level for goods platforms (except horse and end-loading platforms) .	685 mm. (2 ft. 3 in.)

NOTE.—for items 4, 5 & 6—

(*a*) Platforms may be flush with rail level.

Chapter II—Station Yards

(*b*) The ends of all platforms (except end-loading platforms) must be ramped to a slope of 1 in 6 for a width of not less than 1 metre (3 ft. 6 in.) from the face of the platform wall; the rest can either be ramped to the same slope or fenced.

(*c*) The height of platforms serving superelevated track should be measured vertically from the face to a plane passing through the top of both the rails.

Buildings and Structures—

7. Minimum horizontal distance of any building on a passenger platform from centre line of track:—		
(*i*) from platform level to 305 mm. (1 ft.) above platform level	4 850 mm. (15 ft. 11 in.) increasing uniformly to 5 000 mm. (16 ft. 5 in.)	
(*ii*) from 305 mm. (1 ft.) above platform level to 2 970 mm. (9 ft. 9 in.) above rail level	5 000 mm. (16 ft. 5 in.)	

Chapter II—Station Yards

	970 mm. (9 ft. 9 in.) above rail level to 3 200 mm. (10 ft. 6 in.) above rail level.	5 000 mm. (16 ft. 5 in.) decreasing uniformly to 4 550 mm. (14 ft. 11 in.)

NOTE.—For the return end of platform fencing this dimension may be reduced to 2 410 mm. (7 ft. 11 in.).

8. Minimum horizontal distance from centre line of track to any building on a goods platform:—		
(*i*)	from platform level to 305 mm. (1 ft.) above platform level . .	3 020 mm. (9 ft. 11 in.) increasing uniformly to 3 180 mm. (10 ft. 5 in.)
(*ii*)	from 305 mm. 1 ft.) above platform level to	

Chapter II—Station Yards

	3 200 mm. (10 ft. 6 in.) above rail level . . .	3 180 mm. (10 ft. 5 in.)
8 A. Minimum horizontal distance from centre line of track to a pillar, column, lamp or similar isolated structure on any platform:—		
	(*i*) from platform level to 305 mm. (1 ft.) above platform level . . .	3 020 mm. (9 ft. 11 in.) increasing uniformly to 3 180 mm. (10 ft. 5 in.)
	(*ii*) from 305 mm. (1 ft.) above platform level to 3 200 mm. (10 ft. 6 in.) above rail level .	3 180 mm. (10 ft. 5 in.)

Chapter II—Station Yards

NOTE.—A pillar or column which covers more than 3 716 sq. cm. (4 sq. ft.) in plan must be classed as a "building" and not as "isolated structure".

9.	Minimum height above rail level for a width of 1 145 mm. (3 ft. 9 in.) on either side of the centre of track, of tie rods or any continuous covering in a passenger station . . .	5 485 mm. (18 ft. 0 in.)

NOTE.—(*a*) Item 9 does not apply to overhead piping parallel to the track.

(*b*) A low roof, that infringes item 9, is permissible in the case of a goods or transhipping shed on a siding, provided that it does not infringe the outline of the figures for minimum fixed structures out of stations. (*See* Diagram No. 1).

(*c*) A projecting roof of any platform must not infringe Diagram No. 2, except that light weather boarding may be provided along the edge of the roof down to 3 660 mm. (12 ft.) above rail level.

(*d*) Where D.C. electric traction is to be, or is likely to be employed, the minimum distance from centre of

Chapter II—Station Yards

track to any fixed structure from 3 835 mm. (12 ft. 7 in.) above rail level to 4 420 mm. (14 ft. 6 in.) above rail level is to be 1 270 mm. (4 ft. 2 in.).

(*e*) Where 25 kV. A.C. traction is likely to be used, the minimum distance from centre of track to any fixed structure from 4·19 m. (13 ft. 9 in.) to 6·25 m. (20 ft. 6 in.) above rail level is to be 1·6 m. (5 ft. 3 in.).

10.	Minimum height above rail level, for a width of 1 145 mm. (3 ft. 9 in.) on either side of centre of track, of a signal, gantry or overbridge in a passenger station . .	4 420 mm. (14 ft. 6 in.)

NOTE.—(*a*) Where D.C. traction is in use the minimum distance from centre of track to any fixed structure from 3 835 mm. (12 ft. 7 in.) above rail level to 4 420 mm. (14 ft. 6 in.) above rail level is to be 1 270 mm. (4 ft. 2 in.).

(*b*) Where 25 kV. A.C. traction is likely to be used, the minimum height above rail level for a width of 1·6 m. (5 ft. 3 in.) on either side of the centre of track should be as given in item 10 (*ii*) of Chapter I—General.

In case of existing structure a special study shall be made as indicated in Appendix 'A' to Chapter V-A before 25 kV. A.C. traction is introduced.

Chapter II—Station Yards

11. Minimum horizontal distance from centre of track to any structure:—	
(*i*) from rail level to 305 mm. (1 ft.) above rail level .	1 370 mm. (4 ft. 6 in.)
(*ii*) from 305 mm. (1 ft.) above rail level to 3 200 mm. (10 ft. 6 in.) above rail level . . .	1 905 mm. (6 ft. 3 in.)
(*iii*) from 3 200 mm. (10 ft. 6 in.) above rail level to 3 960 mm. (13 ft. 0 in.) above rail level .	1 905 mm. (6 ft. 3 in.) decreasing to 1 145 mm. (3 ft. 9 in).

Chapter II—Station Yards

(*iv*) from 3 960 mm. (13 ft. 0 in.) to 5 485 mm. (18 ft. 0 in.) above rail level .	1 145 mm. (3 ft. 9 in.)

NOTE.—*See* Appendix for extra clearance required on curves.

Points and Crossings—

12. Maximum clearance of check rail opposite nose of crossing .	44 mm. (1·3/4 in.)
13. Minimum clearance of check rail opposite nose of crossing and at heel of switch rail	41 mm. (1·5/8 in.)
14. Maximum clearance of wing rail at nose of crossing . .	44 mm. (1·3/4 in.)

NOTE.—In the case of mixed Broad Gauge and Metre Gauge turnouts, the maximum clearance shown

Chapter II—Station Yards

(against items 12 and 14 may be increased to 48 mm. (1·7/8 in.).

15.	Minimum clearance of wing rail at nose of crossing . . .	41 mm. (1·5/8 in.)
16.	Minimum clearance between toe of open switch and stock rail . . .	89 mm. (3·1/2 in.)
17.	Maximum degree of curvature for slip points, turnouts or cross-over roads .	116 metres (382 ft.) radius

NOTE.—This may be reduced to not less than the minimum of 109 metres (358 ft.) radius in special cases such as 1 in 8.1/2 scissors crossings to allow for sufficient straight over the diamond crossing between the cross-overs.

18.	Minimum angle of crossing (Ordinary) .	1 in 12

Chapter II—Station Yards

NOTE.—Crossings as flat as 1 in 16 will usually be sanctioned if recommended by the Addl. Commissioner of Railway Safety.

19.	Minimum angle of Diamond Crossing .	1 in $8\frac{1}{2}$
20.	Minimum length of tongue rail . .	2 145 mm. (9 ft.)
21.	Minimum length of train protection, point locking or fouling treadle bar . .	12 200 mm. (40 ft.)

NOTE.—There must be no change of superelevation (of outer over inner rail) between points 15 metres (50 ft.) outside toe of switch rail and nose of crossing respectively, except in the case of special crossings leading to snag dead-ends or under circumstances as provided for in item 22.

22. Superelevation and speed in stations on curves with turnouts of contrary and similar flexure:—

Main line.—Subject to the permissible run through speed, based on the

Chapter II—Station Yards

standard of interlocking, the equilibrium superelevation, calculated for the speed of the fastest train, may be reduced by a maximum amount of 50 mm. (2 in.) without reducing speed on the main line.

Turnouts.—(*i*) *Curves of contrary flexure.*—The equilibrium superelevation in millimetres should be calculated by the formula below:—

$$C = \frac{7080}{R}$$

where R = radius of turnout in metres

or

$$C1 = \frac{1048}{R1}$$

where R1 = radius of turnout in feet.

The permissible negative superelevation on the turnout

Chapter II—Station Yards

(which is also the actual superelevation of the main line) may then be made 50—C mm. (2—C1 in inches).

(*ii*) *Curves of similar flexure.*—The question of reduction or otherwise of superelevation on the main line must necessarily be determined by the Administration concerned. In the case of a reverse curve close behind the crossing of the turnout, the superelevation may be run out at the maximum rate of 1 mm. in 360 mm. (1 in. in 30 ft.).

Chapter III—Workshops and Station Machinery

CHAPTER III—WORKSHOPS AND STATION MACHINERY

Water Tanks and Water Cranes—

1. Minimum height above rail level for discharge orifice of water crane . .	3 660 mm. (12 ft. 0 in.)

Workshops and Running Sheds—

2. Minimum distance from centre to centre of tracks in workshops . . .	3 810 mm. (12 ft. 6 in.)
3. Minimum clear distance from centre of track to any isolated structure such as a pillar in:—	
(*i*) Workshops . .	1 980 mm. (6 ft. 6 in.)
(*ii*) Running Sheds .	2 135 mm. (7 ft. 0 in.)

Chapter III—Workshops and Station Machinery

4. Minimum clear distance, for a height of 1 830 mm. (6 ft.) above rail level, from centre of track to any continuous structure in:—	
(*i*) Workshops . .	2 440 mm. (8 ft. 0 in.)
(*ii*) Running Sheds .	2 745 mm. (9 ft. 0 in.)

NOTE.—For standard C Railways, minimum horizontal distance, for a height of 1 830 mm. (6 ft.) above rail level, on either side of centre of track to any continuous structure in running sheds shall be 2 440 mm. (8 ft. 0 in.).

5. Minimum height above rail level to overhead tie bars, girders, etc., in Workshops and Running Sheds:—	

Chapter III—Workshops and Station Machinery

(*i*) Where electric traction is not likely to be used . .	3 810 mm. (12 ft. 6 in.)
(*ii*) Where electric traction is likely to be used . . .	6·25 m. (20 ft. 6 in.)
6. Minimum height above rail level of doorways, for a width of 1 525 mm. (5 ft. 0 in.) on either side of centre of track, in both Workshops and Running Sheds:—	
(*i*) Where electric traction is not likely to be used . .	3 810 mm. (12 ft. 6 in.)
(*ii*) Where electric traction is likely to be used . . .	6·25 m. (20 ft. 6 in.)

Chapter IV(a)—Rolling Stock (Carriage and Wagon)

CHAPTER IV(A)—ROLLING STOCK (CARRIAGE AND WAGON)

Wheels and Axles—

1. Wheel gauge, or distance apart for all wheel flanges . .	930 mm. (3 ft. 0·5/8 in.)
2. (*i*) Maximum diameter on the tread of new carriage or wagon wheel, measured at 57 mm. (2¼ in.) from wheel gauge face . . .	724 mm. (2 ft. 4 1/2 in.)
(*ii*) Minimum diameter on the tread of new carriage or wagon wheel, measured at	

Chapter IV(a)—Rolling Stock (Carriage and Wagon)

	57 mm. ($2\frac{1}{4}$ in.) from wheel gauge face . .	711 mm. (2 ft. 4 in.)
3.	Minimum projection for flange of new tyre measured from tread at 57 mm. ($2\frac{1}{4}$ in.) from wheel gauge face	25·5 mm. (1 in.)
4.	Maximum projection for flange of worn tyre measured from tread at 57 mm. ($2\frac{1}{4}$ in.) from wheel gauge face	32 mm. (1 1/4 in.)
5.	Maximum thickness of flange of tyre, measured from wheel gauge face at 13 mm. ($\frac{1}{2}$ in.) from outer edge of flange . .	25·5 mm. (1 in.)

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6. Minimum thickness of flange of tyre measured from wheel gauge face at 13 mm. ($\frac{1}{2}$ in.) from outer edge of flange . . .	16 mm. (5/8 in.)
7. Minimum width of tyre	114 mm. ($4\frac{1}{2}$ in.)
8. Incline of tread .	1 in 20

Height of Floors—

9. Maximum height above rail level for floor of any unloaded vehicle .	965 mm. (3 ft. 2 in.)
10. Minimum height above rail level for floor of fully loaded passenger vehicle . . .	750 mm. (2 ft. 5·1/2 in.)

Chapter IV (a)—Rolling Stock (Carriage and Wagon)

11. Minimum height above rail level for floor of fully loaded goods vehicle	735 mm. (2 ft. 5 in.)

NOTE.—This does not apply to crocodile wagons.

Buffers and Couplings—

12. Buffers . . .	Central.
13. Maximum height above rail level for centres of buffers for unloaded vehicle . . .	585 mm. (1 ft. 11 in.)
14. Minimum height above rail level for centres of buffers for fully loaded vehicle . . .	535 mm. (1 ft. 9 in.)

Wheel Base and Length of Vehicles—

15. Maximum rigid wheel base for four-wheeled vehicle:—

Chapter IV (a)—Rolling Stock (Carriage and Wagon)

(*i*) On line whose sharpest curvature is Radius : 175 metres (573 ft.) . .	4 875 mm. (16 ft. 0 in.)
(*ii*) On lines whose sharpest curvature is more than 175 metres (573 ft.) Radius.	3 660 mm. (12 ft. 0 in.)

NOTE.—The limiting curvature of radius 175 metres (573 ft.) does not apply to turnouts.

16. Maximum distance apart of bogie centres for bogie vehicle. .	13 715 mm. (45 ft. 0 in.)
17. (*i*) Minimum rigid wheel base for bogie truck of any vehicle .	1 145 mm. (3 ft. 9 in.)
(*ii*) Minimum rigid wheel base for	

Chapter IV (a)—Rolling Stock (Carriage and Wagon)

bogie truck of passenger vehicle	1 450 mm. (4 ft. 9 in.)
18. Maximum length of body or roof for—	
(*i*) Four-wheeled vehicle . . .	8 540 mm. (28 ft. 0 in.)
(*ii*) Bogie vehicle	19 510 mm. (64 ft. 0 in.)

NOTE.—(*a*) A cornice may project beyond the maximum permissible length of the roof in each case, upto 51 mm. (2 in.) beyond each end of the vehicle.

(*b*) Fittings on the end of a vehicle, such as step irons, vacuum brake piping, electrical connections, etc., need not be kept within the prescribed maximum permissible lengths for bodies of vehicles, but may project beyond the end of the body to a reasonable extent.

19. Maximum length of underframe overhead stocks for.	
(*i*) Four-wheeled vehicle . .	8 540 mm. (28 ft. 0 in.)

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(*ii*) Bogie vehicle .	19 050 mm. (62 ft. 6 in.)
20. Maximum distance apart between any two adjacent axles .	11 890 mm. (39 ft. 0 in.)

Maximum Moving Dimensions—

(See *Diagram Nos.* 1 *and* 2).

21. Maximum width over all projections at 102 mm. (4 in.) above rail level *when fully loaded* . . .	1 830 mm. (6 ft. 0 in.)
22. Maximum width over all projections at 305 mm. (1 ft.) above rail level *when fully loaded*	2 490 mm. (8 ft. 2 in.)
23. (*i*) Maximum width over all projections from 305 mm. (1 ft. 0 in.) above rail	

Chapter IV (a)—Rolling Stock (Carriage and Wagon)

	level to 710 mm. (2 ft. 4 in.) above rail level, *when fully loaded* . . .	2 490 mm. (8 ft. 2 in.)
	(*ii*) Maximum width over all projections from 710 mm. (2ft. 4 in.) above rail level to 865 mm. (2 ft. 10 in.) above rail level, *when fully loaded* .	2 490 mm. (8 ft. 2 in.) gradually increasing to 2 745 mm. (9 ft. 0 in.)
24.	Maximum width over all projections from 865 mm. (2 ft. 10 in.) above rail level *when fully loaded* to a height	

Chapter IV (a)—Rolling Stock (Carriage and Wagon)

of 3 200 mm. (10 ft. 6 in) *when empty* . .	2 745 mm. (9 ft. 0 in.)

NOTE.—(*a*) Guttering, cornices, destination boards, embarkation lights, lamp cases and alarms signal discs may project 76 mm. (3 in.) on each side beyond 2 745 mm. (9 ft. 0 in.) from a height of 2 565 mm. (8 ft. 5 in.) up to a height of 3 050 mm. (10 ft. 0 in.) above rail level.

(*b*) Reservation card holders, number plates, and hand rails may project 25 mm. (1 in.) on each side beyond 2 745 mm. (9 ft. 0 in.) from a height of 915 mm. (3 ft. 0 in.) up to a height 2 565 mm. (8 ft. 5 in.) above rail level.

(*c*) Passenger carrying stock with 2 745 mm. (9 ft. 0 in.) width must be fitted with inward opening or sliding doors.

25. Maximum width over open doors, including all projections for passenger vehicle .	3 810 mm. (12 ft. 6 in.)
26. Maximum width over open doors, including all projections for goods vehicle . .	3 810 mm. (12 ft. 6 in.

Chapter IV (a)—Rolling Stock (Carriage and Wagon)

NOTE.—Doors of horse boxes, brake vans, luggage vans and rising and falling flap doors of goods wagons are exempted from this rule.

27.	Maximum height above rail level for a width of 305 mm. (1 ft.) on either side of the centre of *unloaded vehicle* . . .	3 430 mm. (11 ft. 3 in.)
28.	Maximum height above rail level at sides of *unloaded vehicle* .	3 200 mm. (10 ft. 6 in.)

NOTE.—See Item 24 note (*a*)

29.	Minimum height above rail level *when fully loaded* for a width of 915 mm. (3 ft. 0 in.) on either side of centre of track, with the exception of wheels and attachments thereto (*vide* note on page 54)	102 mm. (4 in.)

Chapter IV (a)—Rolling Stock (Carriage and Wagon)

NOTE.—(*a*) A tyre or attachment to a wheel or sand pipes in line with the wheel may project below the minimum height of 102 mm. (4 in.) for a distance of 38 mm. (1 1/2 in.) inside and 190 mm. (7 1/2 in.) outside of wheel gauge face.

(*b*) Cattle fenders and life guards may have a width of 2 135 mm. (7 ft. 0 in.) over all. When new, they should not be less than 102 mm. (4 in.) above rail level, but in other cases a clearance of 64 mm. (2 1/2 in.) may be allowed as absolute minimum.

(*c*) Brake gear safety straps of light section may project 38 mm. (1 1/2 in.) below the minimum clearance of 102 mm. (4 in.)

30.	Minimum height above rail level, *when fully loaded* at 1 245 mm. (4 ft. 1 in.) from centre of track . . .	305 mm. (1 ft.)

Loading Gauge for Goods—

31.	Maximum width. .	2 745 mm. (9 ft. 0 in.)
32.	Maximum height above rail level at centre .	3 455 mm. (11 ft. 4 in.)

Chapter IV (a)—Rolling Stock (Carriage and Wagon)

33. Maximum height above rail level at sides.	.	3 225 mm. (10 ft. 7 in.)

NOTE.—The loading gauge is for testing loaded and empty vehicles; the maximum moving dimensions are given in items 24, 27 & 28.

CHAPTER IV(b)—ROLLING STOCK (LOCOMOTIVE)

Wheels and Axles—

1. Wheel gauge or distance apart for wheel flanges :—

(*i*) Wheels with thick flanges . .	927 mm. (3 ft. 0.½ in.)
(*ii*) Wheels with standard flanges. .	930 mm. (3 ft. 0·5/8 in.)
(*iii*) Wheels with thin flanges . .	930 mm. (3 ft. 0·5/8 in.)
(*iv*) Wheels without flanges . .	930 m.m. (3 ft. 0·5/8 in.)

Chapter IV (b)—Rolling Stock (Locomotive)

	(*See* item 5 for identification of thick, standard and thin flanges)	
2. (*i*)	Maximum diameter on the tread of new locomotive carrying wheels measured at 57 mm. ($2\frac{1}{4}$ in.) from wheel gauge face . .	726 mm. (2 ft. 6 in.)
(*ii*)	Minimum diameter on the tread of new locomotive carrying wheels measured at 57 mm. ($2\frac{1}{4}$ in.) from wheel gauge face . . .	711 mm. (2 ft. 4 in.)
3.	Minimum projection for flange of new tyre, measured from tread, at 57 mm.	

Chapter IV (b)—Rolling Stock (Locomotive)

	($2\frac{1}{4}$ in.) from wheel gauge face . .	25·5 mm. (1 in.)
4.	Maximum projection for flange of worn tyre, measured from tread at 57 mm. ($2\frac{1}{4}$ in.) from wheel gauge face	32 mm. ($1\frac{1}{4}$ in.)
5.	Maximum and minimum thicknesses of tyre flanges measured at 13 mm. ($\frac{1}{2}$ in.) from the outer edge of flange . .	*Max.* *Min.*
	(*i*) Thick flanges	26 mm. (1·1/32 in.) *
	(*ii*) Standard flanges .	24 mm. (59/64 in.) *
	(*iii*) Thin flanges .	18 mm. (23/32 in.) *

NOTE.—(*a*) The above values of flange thicknesses are measured from the back face of the tyre.

Chapter IV (b)—Rolling Stock (Locomotive)

*(*b*) Minimum size of flange of locomotive tyres shall be determined by condemning profile gauge which specifies the minimum thickness and the limits of angularity of the flange on the gauge face.

6.	Minimum width of tyre	114 mm. (4½ in.)
7.	Incline of tread . .	1 in 20.

Buffers and Couplings—

8.	Buffers . . .	Central.
9.	Maximum height above rail level for centres of buffers for *empty locomotives*. . .	585 mm. (1 ft. 11 in.)
10.	Minimum height above rail level for centres of buffers *when fully loaded* . . .	535 mm. (1 ft. 9 in.)

Maximum Moving Dimensions—

11.	Maximum width over all projections:	

Chapter IV (b)—Rolling Stock (Locomotive)

(*i*) at 102 mm. (4 in.) above rail *level when fully loaded* .	1 830 mm. (6 ft. 0 in.)
(*ii*) from 305 mm. (1 ft.) above rail level to 710 mm. (2 ft. 4 in.) above rail level *when fully loaded* . . .	2 490 mm. (8 ft. 2 in.)
(*iii*) from 710 mm. (2 ft. 4 in.) above rail level to a height of 865 mm. (2 ft. 10 in.) above rail level *when fully loaded* .	2 490 mm. (8 ft. 2 in.) increasing gradually to 2 745 mm. (9 ft. 0 in)
(*iv*) from 865 mm. (2 ft. 10 in.) above rail	

Chapter IV (b)--Rolling Stock (Locomotive)

	level *when fully loaded* to a height of 3 200 mm. (10 ft. 6 in.) above rail level *when empty* .	2 745 mm. (9 ft. 0 in.)
12.	Maximum height above rail level for a width of 305 mm. (1 ft.) on either side of centre of *empty locomotive* .	3 430 mm. (11 ft. 3 in.)
13.	Maximum height above rail level at sides of *empty locomotive* .	3 200 mm. (10 ft. 6 in.)
14.	Minimum height above rail level when *fully loaded* for width of 915 mm. (3 ft. 0 in.) on either side of centre of track, with the exception of	

Chapter IV (b)—Rolling Stock (Locomotive)

	wheels and attachments thereto (*vide* note below) . .	102 mm. (4 in.)

NOTE.—(*a*) A tyre or attachment to a wheel or sand pipes in line with the wheel may project below the minimum height of 102 mm. (4 in.) for a distance of 38 mm. (1½ in.) inside and 190 mm. (7½ in.) outside of the gauge face of the wheel.

(*b*) Cattle fenders and life guards may have a width of 2 135 mm. (7 ft. 0 in.) overall. When new, they should not be less than 102 mm. (4 in.) above rail level, but in other cases a clearance of 64 mm. (2½ in.) may be allowed as absolute minimum.

(*c*) Brake gear safety strape of light section may project 38 mm. (1½ in.) below the minimum clearance of 102 mm. (4 in.)

15.	Minimum height above rail level *when fully loaded* at 1 245 mm. (4 ft. 1 in.) from centre of track . .	305 mm. (1 ft.)

CHAPTER V—ELECTRIC TRACTION
Direct Current

NOTE.—Wherever electric traction, employing overhead conductor wires is in use, strict orders must be issued prohibiting anyone from getting on the roofs of vehicles until the current in the overhead conductors has been switched off and the conductors themselves have been earthed.

1. Minimum height from rail level to the under-side of live conductor wire—		
(*i*) (*a*) Under bridges	.	3 810 mm. (12 ft. 6 in.)
(*b*) In tunnels	.	4 420 mm. (14 ft. 6 in.)
(*ii*) In the open	.	5 030 mm. (16 ft. 6 in.)
(*iii*) In running and carriage sheds	.	5 335 mm. (17 ft. 6 in.)
(*iv*) At level crossings		5 485 mm. (18 ft. 0 in.)

Chapter V—Electric Traction
Direct Current

NOTE.—The height prescribed in item 1(iv) applies also to tramway trolley wires crossing the railway.

2. Maximum variation of live conductor wire on either side of the centre line of track—		
(*i*) On straight track	.	229 mm. (0. ft. 9 in)
(*ii*) On curves (on the inside of the curve)		380 mm. (1 ft. 3 in.)
3. Minimum distance between live conductor wire and any structure		152 mm. (0 ft. 6 in.)
4. Maximum width of pantograph collector	.	2 030 mm. (6 ft. 8 in.)

Chapter V-A—Electric Traction 25 kV. A.C. 50 Cycles

CHAPTER V-A—ELECTRIC TRACTION 25 KV. A.C. 50 CYCLES

Diagrams 1 Modified and 2A (revised) modified.

NOTE.—Wherever electric traction is in use, special precautions shall be taken in accordance with provisions made in Chapter XIX—General Rules for all Open Lines of Railways.

Electrical Clearances :

1. Minimum vertical distance between any live bare conductor (overhead equipment or pantograph) and any earthed structure or other bodies (rolling stock, over bridges, signal gantries, etc.).	
(*i*) when the conductor is at rest	320 mm. (1ft. 5/8 in.)
(*ii*) when the conductor is not at rest	270 mm. (0 ft. 10·5/8 in.)

Chapter V-A—Electric Traction 25 kV. A.C. 50 Cycles

NOTE.—A minimum vertical distance of 340 mm. (1 ft. 1 1/2 in.) shall normally be provided between rolling stock other than steam locomotives and contact wire to allow for a 20 mm. (7/8 in.) temporary raising of the tracks during maintenance. Wherever the allowance required for track maintenance exceed 20 mm. (7/8 in.) the vertical distance between rolling stock and contact wire shall correspondingly be increased. For steam locomotives the figure 340 mm. (1 ft. 1 1/2 in.) shall be increased to 380 mm. (1 ft. 3 in.).

2. Minimum lateral distance between any live bare conductor (overhead equipment) and any earthed structure or other bodies (rolling sock, over bridges, signal gantries, etc.).		
	(*i*) when the conductor is at rest	320 mm (1 ft. 5/8 in.)
	(*ii*) when the conductor is not at rest	220 mm. (0 ft. 8 3/4 in.)

Chapter V-A—Electric Traction 25 kV. A.C. 50 Cycles

3. Height of contact wire :—

(*i*) Minimum height from rail level to the under-side of live conductor wire under bridges and in tunnels (*See* para 4 a) of Appendix A and note (a) below	4·02 m. (13 ft. 2 1/4 in.)

NOTE.—Para 4 (*a*) of Appendix A explains the basis of this dimension.

(*ii*) in the open . .	5·50 m. (18 ft. 0 in.)
(*iii*) at level crossings.	5·50 m. (18 ft. 0 in.)
(*iv*) in running and carriage sheds wherever staff are expected to work on the roof of rolling stock .	5·50 m. (18 ft. 0 in.)

Chapter V-A—Electric Traction 25 kV. A.C. 50 Cycles

NOTE.—(*a*) Even though the minimum height is stipulated as 4·02 m. (13 ft. 2 1/4 in.) normally, the height of the contact wire should not be reduced below 4·65 m.

(*b*) Wherever over-dimensional consignments are contemplated to be hauled under live traction conductors, the height specified under 2 (*i*) above, shall be increased by the difference between the height of the consignment contemplated and 3·63 m. (11 ft. 10.7/8 in.) (*See* para 4 b of Appendix). In case such an over dimensional consignment is moved at speeds not exceeding 15 km/h (10 m.p.h.) and also specially escorted by authorised railway staff, the derived height of contact wire may be reduced by 50 mm. (1·7/8 in.).

(*c*) On curves, all vertical distances specified in item 2 above, shall be measured above the level of the inner rail, increased by half the super-elevation.

4. Maximum Variation of Live Conductor Wire on Either Side of the centre Line of Track.

(*i*) on straight track . 200 mm. (0 ft. 7.7/8 in.)

(*ii*) on curves . 300 mm. (0 ft. 11·3/4 in.).

5. Maximum width of pantograph collector 1800 mm. (5 ft. 10.7/8 in.).

Chapter I-R—General

SCHEDULE II

The following are some recommended dimensions, which are generally considered good practice, and the adoption of which will lead to very desirable uniformity on Indian Railways, but they are not to be treated as standards, a departure from which requires sanction.

Under Chapter II-R, Station Yards, are also included some dimensions which will facilitate future expansion.

CHAPTER I-R—GENERAL

Where it can be done without appreciable increase of cost, it is desirable to make all clearances greater than those prescribed in Schedule I.

Spacing of Tracks—

1-R.	Minimum distance centre to centre of tracks . . .	3 960 mm. (13 ft. 0 in.)

NOTE.—*See* Appendix for extra clearance required on curves.

Chapter I-R—General

Formation, Single Line—

2-R.	Minimum width in embankment . .	4 880 mm. (16 ft. 0 in.)
3-R.	Minimum width in cutting (excluding side drains) . .	4 270 mm. (14 ft. 0 in.)

Formation, Double Line—

4-R.	Minimum width in embankment . .	8 840 mm. (29 ft. 0 in.)
5-R.	Minimum width in cutting (excluding side drains) . .	8 230 mm. (27 ft. 0 in.)

NOTE.—(*a*) For Standard C lines, 2 R may be reduced to 4 270 mm. (14 ft. 0 in.), 3R to 3 660 mm. (12 ft. 0 in.), 4R to 8 230 mm. (27 ft. 0 in.) and 5R to 7 620 mm. (25 ft. 0 in.).

(*b*) On a curve the width of formation for double line should be increased by the amount shown in col. 8 of the Appendix.

Chapter I-R—General

Gauge on Curves—

6-R. The Gauge on curves shall be as follows :—

Exact Gauge . .	Up to Curves of 292 metre (955 ft.) radius.
6 mm. (1/4") Slack . .	Above Curves of 292 m. (955 ft) and upto 175 m. (573 ft.) radius.
13 mm. (1/2") Slack .	Above curves 175 mm. (573 ft.) and upto 109 m. (358 ft.) radius.

Speed on Curves—

7-R. The maximum speed permissible for

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rolling stock in good order on fully ballasted first class track for transitioned curves should be determined by the following formula—

$$V = 4 \cdot 4\sqrt{R - 70}$$

where V = maximum speed in kilometres per hour,

R = Radius of curve in metres.

or

$$V1 = 1 \cdot 5\sqrt{R1 - 220}$$

where V1 = Maximum speed in miles per hour,

R1 = Radius of curve in feet.

For non-transition curves the maximum speed should be 4/5th of V & V1.

The above speeds are subject to the maximum speed permitted on the section of railway concerned.

Chapter I-R—General

The value of super-elevation is often over-estimated. It is suggested that the super-elevation provided should suit the maximum speed at which the majority of trains may reasonably be expected to travel round the curve.

Maximum super-elevation	102 (4	mm. in.)
Maximum deficiency permissible in cant calculated for the speed of the fastest train on the Section . . .	50 (2	mm. in.)

Transition Curves—

8-R. Except between points and crossings the ends of circular curves should be properly eased by transition approaches.

Chapter I-R—General

The Chief Engineer of each railway may adopt in each case the method of inserting transition curves which he may consider most suitable.

(*See* Technical Papers Nos. 300 and 301 also Quarterly Technical Bulletin, Vol. IV No. 43, October, 1936).

Sleepers—

9-R.	Minimum length .	1 830 mm. (6 ft. 0 in.)
10-R.	Minimum breadth .	203 mm. (0 ft. 8 in.)
11-R.	Minimum depth .	114 mm. (0 ft. 4½ in.)

NOTE.—(*a*) For deodar and other soft wood sleepers, used with bearing plates, a section of 178 mm. × 127 mm. (7 in. × 5 in.) would probably be better.

Chapter I-R—General

(*b*) For Standard C lines, half round sleepers may be used with the following minimum dimensions at rail seat :—

Minimum width of heart wood at top of sleeper . . .	90 mm. (3 1/2 in.)
Minimum width of bottom of sleeper .	200 mm. (8 in.)
Minimum depth of sleeper . . .	115 mm. (4 1/2 in.)
Minimum cross sectional area . .	230 sq. cm. (36 sq. in.)

(*c*) Perpendiculars drawn from centres of bearing surfaces at top and bottom of half round sleepers should not be more than 25 mm. (one inch) apart.

12-R. The following minimum sleeper densities are recommended for adoption :—

Chapter I-R—General

I. On Primary track

(*i*) 1430 sleepers per Km. where the traffic density exceeds 2·5 million G.Te. Km. (Gross Tonne Kilometre) per Km. per annum but does not exceed 5 million G. Te.Km. per Km. per annum.

or

2300 sleepers per mile, where the traffic density exceeds 2·5 million G.T.M. per mile per annum but does not exceed 5 million G.T.M. per mile per annum.

(*ii*) 1500 sleepers per Km. where the

traffic density exceeds 5 million G. Te.Km. per Km. per annum.

or

2400 sleepers per mile, where the traffic density exceeds five million G.T.M. per mile per annum.

II. On Secondary track

1340 sleepers per Km. where the traffic density exceeds 1·25 million G.Te. Km., per Km. per annum, but it does not exceed 2·5 million G.Te.Km. per Km. per annum.

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or	
2150 sleepers per mile, where the traffic density exceeds 1·25 million G.T.M. per mile per annum but does not exceed 2·5 million G.T.M. per mile per annum.	

NOTE.—(*a*) Actual number of sleepers may vary slightly depending on the length of rail.

(*b*) On tertiary track lesser sleeper density may be provided.

(*c*) On bridges where the cross sleepers rest directly on longitudinal girders, the sleepers are to be spaced so as to allow not more than 305 mm. (1 ft.) between the edges of adjacent sleepers, and are to be not less than 152 mm. (6 in.) deep exclusive of any notching, which may be required to allow for cover plates, canber etc.

(*d*) The length of cross timbers laid on longitudinal girders may be reduced to not less than 305 mm. (1 ft.) greater than the distance outside to outside of the girder flanges.

The minimum length of steel trough sleepers should be the distance outside to outside of girder flanges subject to minimum of 1 675 mm. (5 ft. 6 in.).

Chapter I-R—General

Bridges—

NOTE.—It is advisable that guard rails should be provided on bridges where a derailment would be likely to result in serious damage to the structure, *e. g.*, through spans. Check rails are not necessary except where a sharp curve crosses a bridge. Where cross sleepers whether wooden or steel are provided the guard rail should be fastened to each cross sleeper.

Ballast—

13-R. The following minimum widths and depths of ballast are recommended:—

(*i*) Width of ballast at level of foot of rail . . .	2 290 mm. (7 ft. 6 in.)
(*ii*) Depth of ballast below sleeper .	203 mm. (8 in.)

NOTE.—(*a*) On lines carrying heavy traffic a 102 mm. (4 in.) soling of brick or stone below the ballast is desirable.

(*b*) It must be understood that the recommendations of 12-R and 13-R are for good formation. On

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poor formation either the number of sleepers or depth of ballast or both may have to be increased. In this connection *See* Technical Paper No. 245, Section D-9 and D-10.

Rails—

The axle loads specified in this and the following item are for general guidance only. The actual axle load to be permitted will depend on the type of rail flat footed (or bull headed), extent of wear, modulus of track, wheel arrangement of the vehicle and the hammer-blow, etc.

14-R. Maximum axle loads at 72 kilometres (45 miles) per hour, for rolling stock in good order and with first class track, on different sections of

Chapter I-R—General

rails, provided the rail has not lost more than 5 per cent, of its original section and that the amount of ballast and number of sleepers is adequate (*See* Items 12-R and 13-R of this Chapter).

Section of rail. (Weight when new)	*Axle load including weight of wheels and axle*
37·0 K.gms./metre (75 lbs./yard)	17·5 metric tonnes (17·00 tons).
34·5 K.gms./metre (70 lbs./yard)	15·5 metric tonnes (15·5 tons).
32·0 K.gms./metre (65 lbs./yard)	14·00 metric tonnes (14·00 tons).
30·0 K.gms./metre (60 lbs./yard)	13·00 metric tonnes (13·00 tons).

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27·5 K.gms. metre (55 lbs./yard)	11·5 metric tonnes (11·5 tons).
25·0 K.gms./metre (50 lbs./yard)	10·5 metric tonnes (10·5 tons).
22·5 K.gms./metre 50) lbs./yard)	9·0 metric tonnes (9·00 tons).
20·0 K.gms./metre (40 lbs./yard)	8·0 metric tonnes (8.00 tons).

NOTE.—These recommendations are on the assumption that the road is well maintained with at least the number of sleepers given in 12-R of this Chapter.

15-R. Maximum axle loads on "Standard C" railways for speeds limited to 24 kilometres (15 miles) per hour provided the rail has not lost more than 5 per cent of its original section.

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Section of rail, (Weight when new)	*Axle load including weight of wheels and axle*
25·0 K.gms./metre (50 lbs./yard)	13·5 metric tonnes (13·5 tons)
22·5 K.gms./metre (45 lbs./yard)	12·5 metric tonnes (12·5 tons)
20·0 K.gms./metre (40 lbs./yard)	11·0 metric tonnes (11·0 tons).

TUNNELS, OVERBRIDGES, TROUGH AND SEMI-TROUGH GIRDER BRIDGES

(*See* Diagram 2-A Revised and 2A revised modified).

16-R. (*i*) Minimum distance centre to centre of track . . 3 960 mm. (13 ft. 0 in.)

(*ii*) Minimum horizontal distance from centre of track to

any structure shall be as follows :—

Height above rail level.	*Horizontal distance from centre of track.*
(a) From 0 mm. (0 ft.) to 305 mm. (2 ft. 3 in.)	1 370 mm. (4 ft . 6 in.)
(b) From 305 mm. (1 ft). to 685 mm. (2 ft. 3 in.)	1 370 mm. (4 ft. 6 in.) increasing to 2 135 mm. (7 ft. 0 in.)
(c) From 685 mm. (2 ft. 3 in.) to 3 505 mm. (11 ft. 6 in.) . . .	2 135 mm. (7 ft. 0 in.)
(d) From 3 505 mm. (11 ft. 6 in.) to 4 420 mm. (14 ft. 6 in.) .	2 135 mm. (7 ft. 0 in.)

Chapter I-R—General

	decreasing to 1 065 mm. (3 ft. 6 in.)
(*iii*) Minimum height above rail level at centre of track for overhead structures	4 420 mm. (14 ft. 6 in.)

NOTE.—(*a*) *See* Appendix for extra clearance required on curves.

(*b*) Where D.C. Electric traction is in use or likely to be used in the future, the minimum height should be 4 800 mm. (15 ft. 9 in.) for a width of 1 065 mm. (3 ft. 6 in.) each side of the centre line.

(*c*) Where 25 kV. A.C. traction is likely to be used the minimum horizontal distance from centre of track to any structure from 3·5 m (11 ft. 6 in.) to 5·41 m. (17 ft. 9 in.) above rail level should be 1·27 m. (4 ft. 2 in.).

CHAPTER II-R.—STATION YARDS.

Spacing of Tracks—

1-R(*i*)	Minimum distance centre to centre of tracks where it is likely that a water column, signal post, overbridge standard, etc., may be required between tracks	4 420 mm. (14 ft. 6 in.)
(*ii*)	For lines which are not passenger lines .	4 265 mm. (14 ft. 0 in.)

NOTE.—(*a*) In large yards, this extra clearance should be provided at every third track, if space permits.

(*b*) *See* Appendix for extra clearance required on curves.

Lengths of Sidings—

2-R.	Minimum clear available length of one siding at any station where it is	

Chapter II-R.—Station Yards

intended to cross trains—

(*i*) At a non-watering station—7 per cent longer than the longest train permitted to run on the section.

(*ii*) At a watering station—such that when the train engine is standing (and taking water) at the water column the rear of the longest train permitted to run on the section shall be at least 15 metres (50 ft.) clear of the fouling mark in rear, and such that when a second assisting engine is standing (and taking water) at the water column the leading engine is clear of the fouling mark in front.

Chapter II-R.—Station Yards.

(*iii*) Although it may not be necessary till traffic develops to provide sidings for the largest possible train loads, land should be acquired for them and no building, level crossing or other obstruction should be permitted that will interfere with one crossing siding being lengthened to the following dimensions :—

On sections of the Railway where the ruling gradient is :	Minimum clear available length of one siding.
1 in 500 or flatter	610 metres (2,000 ft.)

Chapter II-R.—Station Yards.

Between 1 in 500 and 1 in 300 . . .	490 metres (1,600 ft.)
Between 1 in 300 and 1 in 100 . . .	460 metres (1,500 ft.)
Between 1 in 100 and 1 in 50 . . .	400 metres (1,300 ft.)
Steeper than 1 in 50	310 metres (1,000 ft.)

3-R. Recommended maximum gradient in Station Yards . .	1 in 1,000

NOTE.—For the purpose of item 3-R a station yard may be taken to extend—

(*a*) On single line to a distance of 50 metres (150 ft.) beyond the outermost points at either end of the station.

(*b*) On double line from Home Signal to last stop signal of each line.

Chapter II-R.—Station Yards.

Platforms—

4-R. (*i*) Signal wires or supports for signal wires may be allowed underneath the platform coping.

(*ii*) The length of a passenger platform should not be less than the length of the longest passenger train excluding the engine, booked to stop at the platform.

5-R. End-loading platforms and platforms on sidings used exclusively for horse loading may be raised to a height of 865 mm. (2 ft. 10 in.) above rail level.

Chapter II-R.—Station Yards.

Building and Structures—

6-R.	(*i*) Minimum horizontal distance of any building or longitudinal boundary fence from the edge of a platform which is not an island platform . .	5 485 mm. (18. ft. 0 in.)
	(*ii*) Recommended horizontal distance from the edge of a platform to any building on a passenger platform which is not an island platform .	9 755 mm. (32 ft. 0 in.)

NOTE.—(*a*) Item 6-R(*ii*) allows for setting back the platform to make room for an additional track in future without infringing item 6-R(*i*).

7-R.	Recommended horizontal distance from	

Chapter II-R.—Station Yards.

	the edge of a platform to any building on a goods platform .	3 050 mm. (10 ft. 0 in.)

NOTE.—Items 6-R and 7-R should also apply to buildings and isolated structures, not readily removable, erected on ground over which it is anticipated that a platform may be extended in future.

8-R.	Minimum clearance at heel of switch rail	56 mm. (2·3/16 in.)
9-R.	Minimum clearance between toe of open switch and stock rail	100 mm. (4 in.)
10-R.	Where the turnout into a goods yard from a main line is in such a position that train may enter the turnout at more than shunting speed, the turnout should be laid with a	

Chapter II-R—Station Yards.

crossing not wider than 1 in 10 and preferably with a 1 in 12 crossing.

11-R. In the case of turnouts of facing points over which passenger trains have to run, the maximum curvature of the lead should be 219m. (716 ft.) radius.

Chapter III-R—Workshops and Station Machinery.

CHAPTER III-R—WORKSHOPS AND STATION MACHINERY

Water Tanks and Water Cranes—

1-R.(*i*)	Minimum distance from centre of track to face of tank house less than 30 metres (100 ft.) beyond the end of a passenger platform . .	6 860 mm. (22 ft. 6 in.)
(*ii*)	Recommended distance from centre of track to face of tank house less than 60 metres (200 ft.) beyond the end of passenger platform . .	11 125 mm. (36 ft. 6 in.)

Chapter III-R Workshops and Station Machinery.

NOTE.—(*a*) Item 1-R(*i*) and (*ii*) need not be observed in the case of small subsidiary or relay tanks which can easily be moved back to provide room for an extension of the yard.

(*b*) Item 1-R(*i*) allows for the extension of the Platform, and 1-R(*ii*) allows for the laying of an additional track and the extending of the platform in future, without infringing item 6-R, Chapter II-R.

2-R.	Minimum height for bottom of tank above rail level at water column—	
	(*i*) For watering engines . .	6 095 mm. (20 ft. 0 in.)
	(*ii*) For washing out engines . .	12 190 mm. (40 ft. 0 in.)
3-R.	Minimum total tank capacity at any station . . .	28·5 cu. metres or 28,410 litres (1,000

Chapter III-R—Workshops and Station Machinery.

		C. ft.) or (6, 250 gallons.)
4-R.	Minimum internal diameter for piping from tank to water crane . . .	203 mm. (8 in.)

Ashpits, etc.

5-R.	Average depth for ashpits in station yards, pits in running sheds, and carriage examining pits . .	915 mm. (3 ft. 0 in.)

NOTE.—Siting of Ashpits on runthrough lines should, if possible, be avoided.

Workshops and Running Sheds—

6R.	Minimum distance from centre to centre of tracks in running sheds . . .	4 570 mm. (15 ft. 0 in.)

Existing infringements of the Schedule I.

SCHEDULE III

Existing infringements of the dimensions of Schedule I which may be permitted to continue on metre gauge railways—

(*See* Diagram 3.)

The following infringements of the dimensions prescribed in Schedule I may be permitted to continue if existing (*See* Diagram 3) subject to such restrictions of speed for items 1, 2 & 3 as are considered necessary, it being understood that when structures are altered they will be rebuilt to comply with Schedule I, except in case of Structures falling under item.

1. Minimum distance centre to centre of track . . .	3 355 mm. (11 ft. 0 in.)

NOTE—Vehicles wider than 2 590 mm (8 ft. 6 in.) are not to be permitted.

2. Minimum clearance except at platform

Existing infringements of the Schedule I.

between the side of any vehicle and any fixed structure from 305 mm. (1 ft.) above rail level to 685 mm. (2 ft. 3 in.) above rail level, provided that the distance from the centre line of the track to the fixed structure is not less than 1 270 mm. (4 ft. 2 in.) in any case .	127 mm. (5 in.)	
3. Minimum clearance out of stations between the top of any vehicle and any fixed structure above it for a distance of 485 mm. (1 ft. 7 in.) on either side of centre of track, provided that the height from rail level to the fixed structure is not less than 3 660 mm. (12 ft. 0 in.)	229 mm. (9 in.)	

Existing infringements of the Schedule I.

4. Where, as on girder bridges, ashpits, etc., the structure is not likely to be out of plumb and the superelevation (or level of rails) does not vary or where the speed is restricted to 16 km. (10 miles) per hour, the following infringements may be allowed :

(*i*) Minimum distance centre to centre of tracks	3 200 mm (10 ft. 6 in.)
(*ii*) Minimum clearance between the side of any vehicle with doors closed and any fixed structure from 685 mm. (2 ft. 3 in.) above rail level to 3 200 mm. (10 ft. 6 in.)	

Existing infringements of the Schedule I.

above rail level, provided that the distance from the centre line of the track to the fixed structure is not less than 1 755 mm. (5 ft. 9 in) .	455 mm. (1 ft. 6 in.)	
(*iii*) Minimum clearance between the top of any vehicle and any fixed structure above it for a distance of 760 mm. (2 ft. 6 in.) on either side of centre of track, provided that the height from rail level to the fixed structure is not less than 3 555 mm. (11 ft. 8 in.) . .	127 mm. (5 in.)	

NOTE.—(*a*) To the horizontal distances given in items 1 to 4 must be added the extra allowances for

Existing infringements of the Schedule I.

curves (*See* Appendix). Where existing structures do not permit of these allowances being given, they must be reduced by limiting the superelevation to be allowed for outer over inner rail (*See* paragraph 5 of Appendix "Note on extra clearances on curves"). Where this is done, a notice board should be erected against the structure, stating the maximum permissible superelevation.

(*b*) Vehicles wider than 2 590 mm. (8 ft. 6 in.) are not to be permitted.

5. Maximum rigid wheel base for existing four and six-wheeled vehicles on lines whose sharpest curvature is 10 175 m. (573 ft.) radius . . .	5 945 mm. (19 ft. 6 in.)
6. Structures which have already been built in accordance with items 10 of Chapter I, Schedule I and items 8 and 10 of Chapter II of Schedule I may infringe the dimensions *now*	

Existing infringements of the Schedule I.

shown against these items. Such infringements may continue and alterations for the removal of such infringements need be taken up only 25 kV. A.C. electrification is under taken when a study shall be made of each structure to limit the extent of alterations as indicated in Appendix A to Chapter V-A.

Schedule of Dimensions 1 000 mm. (3′—3.3/8″) Gauge, 1930

APPENDIX

Radius of curve	Maximum permissible speed	Super-elevation	Extra clearance between structure and adjacent track			
			Inside of curve		Qutside of curve any height	Extra clearance between adjacent tracks when there is no structure between tracks
			Upto 405 mm. (1 ft. 4 in.) above rail level	From 405 mm. (1 ft. 4 in.) to 3200 mm. (10 ft. 6 in. above rail level		
1750 metres (5, 730 ft.)	72 Km.p.h. (45 m. p. h.)	15 mm. (1/2 in.)	— —	50 mm. (1·5 in)	— —	50 mm. (2·0 in.)
875 metres (2,865 ft.)	72 km. p.h. (45 m.p.h.)	30 mm. (1 1/4 in.)	20 mm. (0·5 in.)	120 mm. (5·0 in.)	— —	100 mm. (4·0 in.)
583 metres (1,910 ft.)	72 km.p.h. (45 m.p.h.)	45 mm. (1 3/4 in.)	40 mm. (1·5 in.)	200 mm. (7·5 in.)	20 mm. (0·5 in.)	150 mm. (6·0 in.)
438 metres (1,432 ft.)	72 km.p.h. (45 m.p.h.)	55 mm. (2 1/4 in.)	60 mm. (2·5 in.)	250 mm. (10·0 in.)	30 mm. (1·0 in.)	200 mm. (8·0 in.)
350 metres (1,146 ft.)	72 km.p.h. (45 m.p.h.)	70 mm. (2 3/4 in.)	80 mm. (3·0 in.)	320 mm. (12·5 in.)	40 mm. (1·5 in.)	250 mm. (9·5 in.)
212 metres (955 ft.)	65 km. p.h. (40 m. p. h.)	65 mm. (2 1/2 in.)	90 mm. (3·5 in.)	320 mm. (12·0 in.)	60 mm. (2·0 in.)	270 mm. (10·5 in.)
250 metres (819 ft.)	56 km. p.h. (35 m.p.h.)	75 mm. (2·7/8 in.)	110 mm. (4·0 in.)	370 mm. (14 0 in.)	70 mm. (2·5 in.)	310 mm. (12·0 in.)
219 metres (716 ft.)	48 km.p.h. (30 m.p.h.)	85 mm. (3 1/4 in.)	130 mm. (5·0 in.)	420 mm. (16·0 in.)	80 mm. (3·0 in.)	350 mm. (13·5 in.)
194 metres (637 ft.)	48 km.p.h. (30 m.p.h.)	90 mm. (3 1/2 in.)	140 mm. (5·5 in.)	460 mm. (18·0 in.)	100 mm. (4·0 in.)	390 mm. (15·0 in.)
175 metres (573 ft.)	40 km.p.h. (25 m.p.h) .	75 mm. 2.7/8 in.)	150 mm. (6·0 in.)	410 mm. (16·0 in.)	110 mm. (4·5 in.)	390 mm. (15·0 in.)
159 metres (521 ft.)	40 km. p.h. (25 m.p.h.)	80 mm. (3·1/8 in.)	160 mm. (6·5 in.)	440 mm. (17·5 in.)	120 mm. (5·0 in.)	420 mm. (16·5 in.)
146 metres (477 ft.)	32 km.p.h. (20 m.p.h.)	55 mm. (2 1/4 in.)	160 mm. (6·5 in.)	360 mm. (14·5 in.)	140 mm. (5·5 in,)	420 mm. (16·5 in.)
134 metres (441 ft.)	32 km.p.h. (20 m.p.h.)	60 mm. (2·3/8 in.)	180 mm. (7·0 in.)	390 mm. (15 5 in.)	150 mm. (6·0 in.)	450 mm. (17·5 in.)
125 metres (409 ft.)	32 km.p.h. (20 m.p.h.)	65 mm. (2 1/2 in.)	200 mm. (7·5 in.)	420 mm. (16·5 in.)	160 mm. (6·5 in.)	480 mm. (19·0 in.)
116 metres (382 ft.)	25 km.p.h. (15 m.p.h.)	40 mm. (1·5/8 in.)	200 mm. (8·0 in.)	340 mm. (13·5 in.)	180 mm. (7·0 in.)	480 mm. (19·0 in.)
109 metres (358 ft.)	25 km.p.h. (15 m.p.h.)	40. mm. (1·5/8 in.)	210 mm. (8·5 in.)	350 mm. (14·0 in.)	190 mm. (7·5 in.)	500 mm. (20·0 in).

Appendix

NOTE.—(*a*) Column 5 applies to goods platforms 685 mm. (2 ft. 3 in.) above rail level which are not on a running line. For such platforms on running lines 25 mm. (1 in.) should be added to the figures given in Cloumn 5.

(*b*) For any height above 3 200 mm. (10 ft. 6 in.) add 1 mm. per 12 mm. (1 inch per foot) of height to the figures given in Column 6.

(*c*) Where there is a structure between tracks, the extra clearance to be provided must be according to Columns 5, 6 and 7 instead of Column 8.

(*d*) Appendix showing the extra clearance on curves has been revised. In the revised table, the maximum permissible speed and corresponding superelevation are indicated and the required clearances based on these superelevations have been given.

Note on extra clearance on curves—

1. It has been contended that the extra clearance prescribed for curves, both in the 1913 and in the 1922 Schedule of Dimensions, was too liberal in the case of platforms, and caused a gap between the platform and footboard at certain parts of a bogie carriage, which was dangerous to passengers. In the 1922 Schedule, the allowance for lurching and sway of the carriage

Appendix

was treated as entirely additional to that already provided for such motions in the clearance given for straight platforms; whereas only additional sway due to the curved track in excess of the maximum occurring on straight track need be provided for. The amount of superelevation allowed for was also excessive on the sharper curves.

2. The clearance provided between a vehicle (*i.e.* the foot-boards) and the platform coping on the straight is 102 mm. (4 inches). It is considered that to reduce the average distance between a curved platform and the foot-boards the minimum clearance between a platform on the outside of curve and the ends of a vehicle or a platform on the inside of a curve and the centre of a vehicle may safely be reduced to 76 mm. (3 inches). Therefore in calculating the extra allowance to be provided on curves as explained in paras 3, 4, 5 and 6 a reduction of this extra allowance has been made of 25 mm. (1 inch) on both the inside and outside of curves is shown in paragraph 7.

3. *Allowance to be made* :—The additional clearance to be given on the inside of a curve

Appendix

must include the affect of curvature, the lean due to superelevation, and an allowance for any additional sway of the vehicle over that already provided for in the clearance on straight tracks. The additional clearance to be given on the outside of a curve must allow for the effect of curvature. Additional sway or lurch due to the curve can be considered as fully counteracted by the inward lean of the vehicle due to superelevation.

4. *Allowance for curvature.*—The allowance for curvature will be the same both for the centre and ends of a vehicle 19 510 mm. (64 ft.) long, 13 715 mm. (45ft.) between bogie centres, *viz.*, the versine of a chord equal in length to the distance between the bogie truck centres, and is

$$V = \frac{(13 \cdot 715)^2 \times 1000}{8R} = \frac{23\ 510 \text{ mm.}}{R}$$

or

$$V1 = \frac{45^2 \times 12}{8R1} = \frac{6075 \text{ inches,}}{2R1}$$

where R is the radius of the curve in metres
R1 is the radius of the curve in feet

Appendix

5. *Allowance for superelevation.*—The lean due to superelevation at any point at height "h" above rail level is given by

$$L = \frac{h\ s}{g},$$

where s is the superelevation,
g the gauge of the track.

6. *Allowance for additional sway on curves:*—The provision for the additional lurch and sway, on the inside of a curve as given in the 1913 and 1922 Schedule, has been adopted namely, one-fourth of the lean due to superelevation. No provision has been made for additional way due to a curve in the outward direction for reasons already given in paragraph 3 above.

7. *Platforms.*—For platforms the total additional clearance to be provided is :—

On the inside of a curve,

(*i*) $V + \frac{5L}{4} - 25$ mm.

Appendix

or

$$V1+\frac{5L_1}{4}-1 \text{ in.}$$

where L is the lean in millimetres
L_1 is the lean in inches.

On the outside of a curve,

(*ii*) V—25 mm.

or

V_1— 1 in.

(*See Paragraph 2 above*)

Column 5 of the Appendix has been calculated for high passenger platform 405 mm. (1 ft. 4 in.) according to fromula (i).

8. *Clearance from adjacent structures on the inside of a curve.*—For obtaining the figures given in Column 6, formula (i) of paragraph 7 above has been used.

9. *Clearance from adjacent structures on the outside of a curve.*—For column 7, formula (ii) of paragraph 7 above has been used.

Appendix

10. *Extra Clearance between adjacent tracks.*—The worst case will be when the end of a bogie carriage on the inner track is opposite the centre of a similar carriage on the outer track. Nothing is allowed for superelevation, it being assumed that both tracks will be inclined the same amount. Though there are cases where a different superelevation is provided on each track, the distance allowed between centres of tracks gives a sufficient margin of safety to permit of this being omitted from consideration.

The formula used for Column 8 is $\frac{2V+2L}{4}$ the height adopted for the value of h, in calculating L & L_1 is 3 200 mm. (10 ft. 6 in.).

11. The formulas of the 1022 Schedule are given here for comparison :—

	1922 Schedule	Present Schedule.
(*i*) Inside of a curve	$V^1+\frac{5L_1}{4}$	$V+\frac{5L}{4}$
		—25 mm.

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(*ii*) Outside of a curve V_1+2'' V—25 mm.

(*iii*) Adjacent tracks $2V_1+\frac{L_1+2''}{4}$ $2V+\frac{2L}{4}$

where V = Versine of a chord in millimetres.

V_1 = Versine of a chord in inches.

Appendix 'A' to Chapter V-A

CLEARANCES REQUIRED FOR 25 KV SINGLE PHASE A.C. ELECTRIC TRACTION.

It is desirable to provide the maximum possible clearance in the case of lines equipped for 25 kV A.C. 50 Cycle single phase electric traction. In no case, shall these be less than the basic dimensions as recommended by the International Union of Railways, on pages 5 & 6 of their leaf-let No. 606 (1st Edition 1-1-57), of which an extract is given below:—

"(A) CLEARANCES BETWEEN LIVE BARE CONDUCTORS (CATENARIES OR PANTOGRAPHS AND STRUCTURES)"

(a) *Distance normally existing only for a brief period (distances between structures and catenary raised momentarily or vehicle pantographs outside normal stopping points).**

(a)2. Operation in which extensive steam traction is used or installations close to the sea.

Appendix 'A' to Chapter V-A

—vertical distance between live conductors and earth—270 mm. (0 ft. 10§ in.).

—lateral distance between live conductors and earth—220 mm. (0 ft. 8¾ in.).

(b) *Distance which may remain for a considerable period (distance between structures and catenary at rest or immobile pantographs at normal stopping points).**

(b)2. Operation in which extensive steam traction is used or installations close to the sea.

—vertical or lateral distances between live conductor and earth 320 mm. (1 ft. 5/8 in.).

(B) CLEARANCES BETWEEN UPPER SECTION OF THE ROLLING STOCK AND CONTACT WIRE.

(a) *Normal Loads*: For normal loads, the distance between the upper part of the load and the lowest point of

Appendix 'A' to Chapter V-A

the contact wire in static position, must be at least equal to D in. D= 340 mm. (1 ft. 1½ in.) in the case of normal loads not receiving any special supervision and with contact wire subject to considerable vertical oscillation under pressure from the pantographs and due to wind.

D. may be reduced to 290 mm. (11½ in.) in the case of specially supervised loads and on condition that the contact wire cannot sway to any considerable extent, due to pressure from the pantograph and wind influence.

(b) *Special loads* : It is incumbent upon each Administration under its own regulations, to determine the derogations to be made to the above mentioned distance, for special loads, in relation to the characteristics of such loads.

(c) *Tracks raised for maintenance purposes*: The above mentioned distances (normal and special loads)

Appendix 'A' to Chapter V-A

relate to tracks in normal conditions. For track maintenance, a reduction of 20 mm. (7/8 in.) may be made to the above mentioned distances it being understood that the passage of the first train following the lifting causes conditions to revert to normal.

*NOTE.—The term "catenary" is used to represent traction overhead equipment.

2. In order to ascertain whether the requisite clearances would be available under an existing structure, the permissible height of the contact wire shall first be determined by competent authority. For this purpose the following particulars should be known :—

(*i*) particulars of the structures including profile.

(*ii*) allowance for slewing of tracks.

(*iii*) allowance for low joints in tracks.

(*iv*) radius of curvature of track under the structure.

(*v*) superelevation of track under the structure.

Appendix 'A' to Chapter V-A

(*vi*) maximum permissible speed under the structure.

(*vii*) maximum dimensions of over dimensional consignments which are permissible and safety measures which would be taken for movement of over dimensional consignments.

(*viii*) location of the structure in relation to level crossings, water columns and turn-outs in the vicinity.

(*ix*) the type of overhead equipment.

3. After determining the permissible height of the contact wire based on the above particulars, the clearance required between the lowest portion of the bridge or structure and the lowest position of the contact wire shall be determined in each case after study of the following :—

(*a*) system of tensioning of the overhead equipment (regulated or otherwise).

(*b*) atmospheric conditions.

(*c*) maximum permissible number of electric locomotives per train (double or trippled headed).

Appendix 'A' to Chapter V-A

(*d*) location of the structure in relation to points and crossings, overlap spans, etc.

(*e*) length of the structure along the tracks.

(*f*) type of structure, girder, masonry, etc.

(*g*) the span of overhead equipment under the bridge.

(*h*) presence of a traction feeder.

(*i*) likelihood of steam locomotives halting under the structure.

4.(*a*) The minimum height of contact wire has been derived on the assumption that the "looked down" height of the pantograph on the 25 kV A.C. locomotives on the Metre Gauge would be 3.68 m. (12 ft. 0.$\frac{1}{8}$ in.). As this dimension is much more than the height of a steam locomotives, within the maximum moving dimension of 1930, *i.e.*, 3.42 m. (11 ft. 3 in.) such locomotives will be able

Appendix 'A' to Chapter V-A

to work on all sections electrified with 25 kV. A.C. traction system under live traction overhead equipment.

Height of the "Looked down" Pantograph	3.68 m (12 ft. $\frac{7}{8}$ in.)
Minimum Clearance to contact wire ..	0.32 m (1 ft. $\frac{5}{8}$ in.)
Allowance for track maintenance ..	0.02 m (0 ft. $\frac{3}{4}$ in.)
Allowance for ionisation over chimney ..	0.04 m (0 ft. $1\frac{1}{2}$ in.)
Total..	4.06 m (19ft. $3\frac{3}{4}$ in.)

(*b*) After determining the minimum height of contact wire on the assumption that it would permit passage standard 25 kV. A.C. locomotives [with a height of 3.68 m. (12 ft. $\frac{7}{8}$ in.)] of the "looked down" pantograph the maximum height of over-dimensional consignments with live overhead equipment at speeds over 15 Km./h (10 m.p.h.) (when vertical oscillation of overhead equipment is pronounced) is derived as under :—

Appendix 'A' to Chapter V-A

Minimum height of contact wire	4.02 m. (13 ft. 2¼ in.)
LESS	
(i) minimum electrical clearance	0.27 m. (0 ft. 10⅝ in.)
(ii) track allowance	0.02 m. (0 ft. ¾ in.)
(iii) allowance for vertical oscillation of contact wire under influence of moving pantograph.	0.10 m. (0 ft. 4 in.)
Total	0.39 m. (1 ft. 3⅜ in.)
Permissible maximum height of over-dimensional consignment.	3.63 m. (11 ft. 10⅞ in.)

(*c*) If an over-dimensional consignment is moved at slow speed not exceeding 15 Km./h. (10 m.p.h.) there will be no downward displacement (due to oscillation) of contact wire. However to cater for the likelihood of an over-dimensional consignment halting under a structure, a clearance of 0.32 m. (1 ft. 0⅝ in.) under rest condition is to be provided, *vide* item 1 of chapter V-A. In this case the derived height of contact wire may be reduced by 59 mm. (2 in.).

Appendix 'A' to Chapter V-A

5. In Chapter I, item 9, the height of structures above rail level has been separately specified for light and heavy structures. It should normally be feasible to erect traction overhead equipment under a structure irrespective of its location and the fact that a structure with a large height would permit a better and more economic layout of traction overhead equipment while a structure with a low height would lessen the cost of the structure itself. Therefore in the case of light structures such as foot over bridges, it would be desirable to keep a standard height of contact wire of 5.04 m. (16 ft. 6½ in.). In the case of heavy structures, such as fly over bridges or road over bridges, it is desirable to keep the height of contact wire as low as possible consistant with the requirements of movement of standard class 'C' over dimensional consignments of height 4.34 m. (14 ft. 3 in.).

M1RB/62—5-2-64—GIPF.

STANDARD DIMENSIONS OUT OF STATIONS.

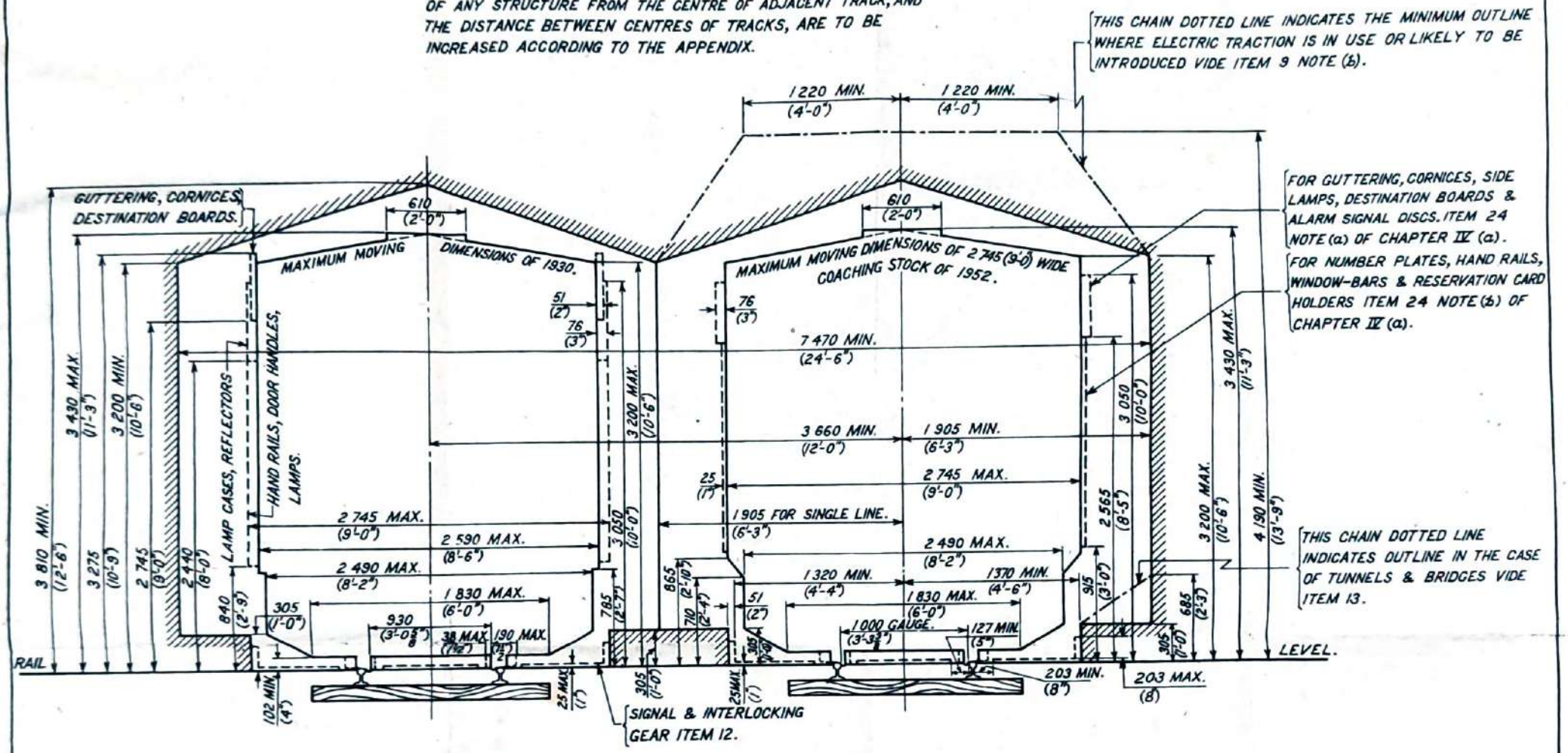
SCHEDULE I-CHAPTER I.

DIAGRAM Nº I.

METRE GAUGE.

1960.

NOTE:- WHERE THE LINE IS ON A CURVE, THE HORIZONTAL DISTANCE OF ANY STRUCTURE FROM THE CENTRE OF ADJACENT TRACK, AND THE DISTANCE BETWEEN CENTRES OF TRACKS, ARE TO BE INCREASED ACCORDING TO THE APPENDIX.



NOTE:-
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT WHERE OTHERWISE SHOWN.

MILLIMETRES 1 000 500 0 — METRES 1 2 3

SCALE

CASE NO. 1 SD/18.

MINIMUM CLEARANCES BETWEEN EXISTING STRUCTURES AND LARGEST ROLLING STOCK IN USE.

PERMITTED UNDER SCHEDULE III.

DIAGRAM Nº 3.
METRE GAUGE.
1960.

FIG. I.
ON EXISTING GIRDER BRIDGES, ASPHITS ETC. OR WITH SPEED RESTRICTIONS OF 16 Km. (10 MILES) PER Hr. ITEM 4 (i), (ii) & (iii).

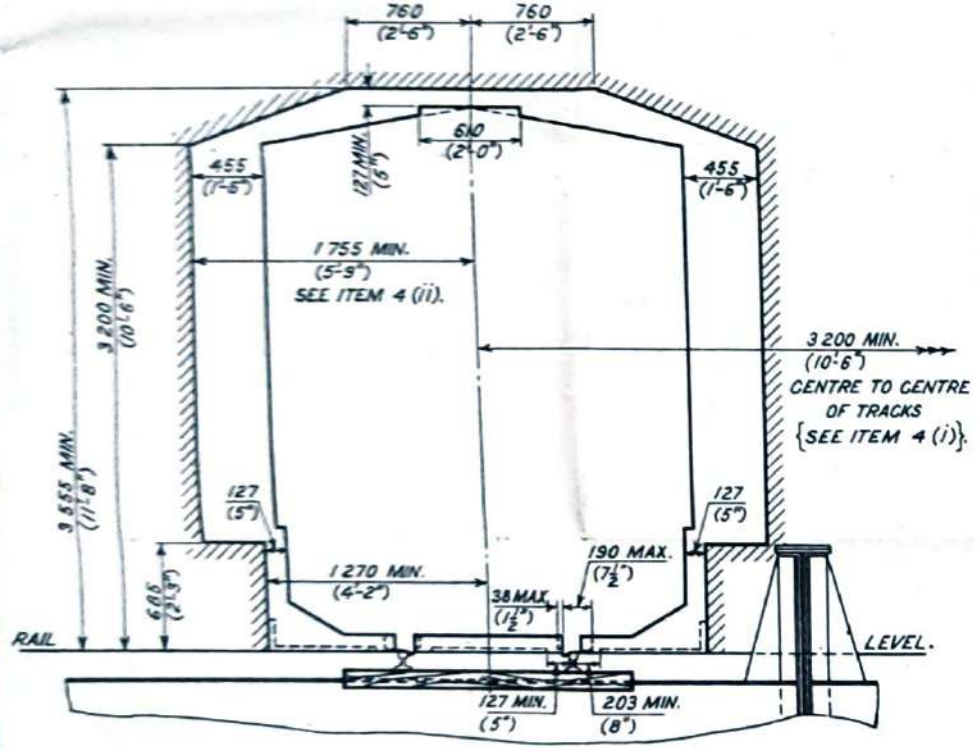
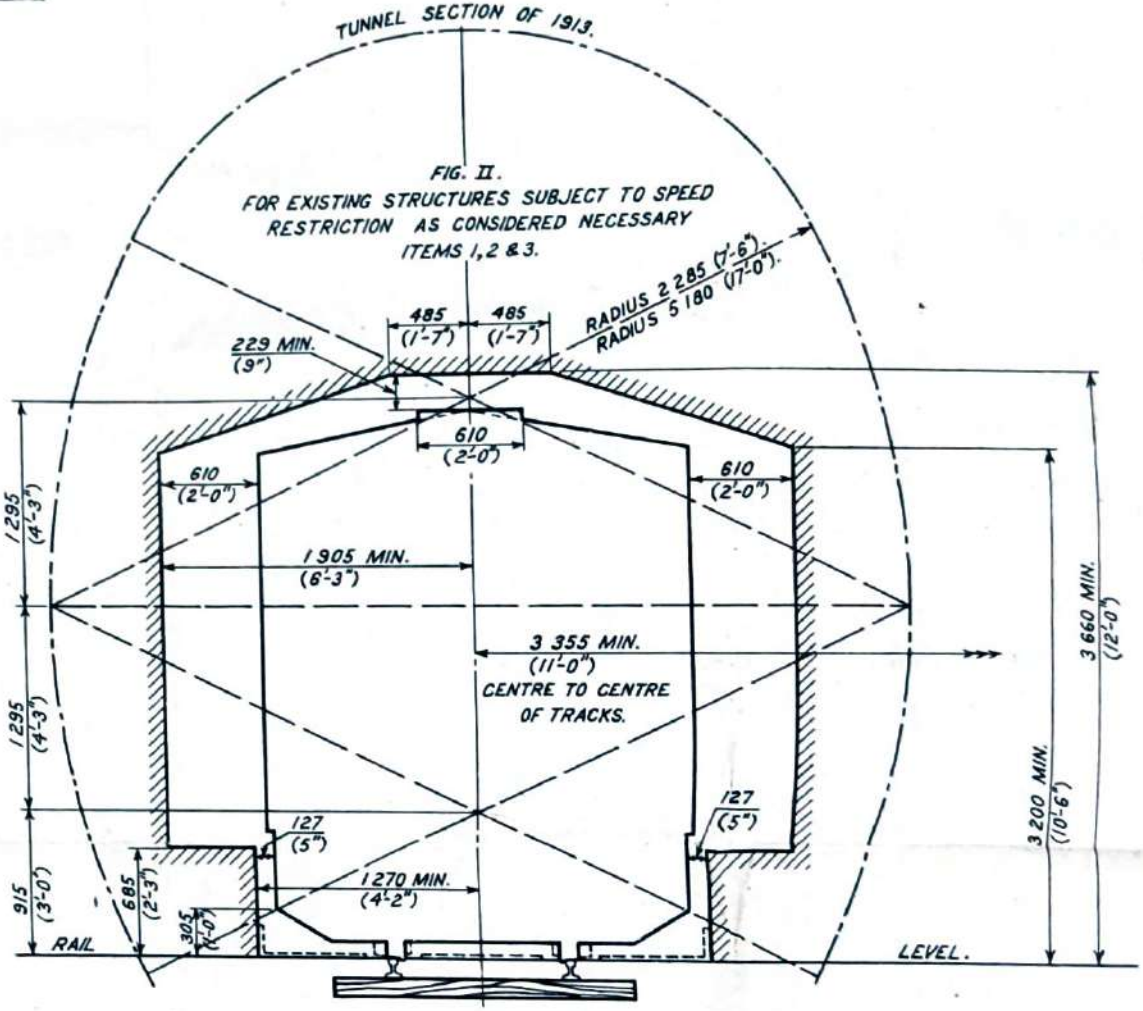


FIG. II.
FOR EXISTING STRUCTURES SUBJECT TO SPEED RESTRICTION AS CONSIDERED NECESSARY ITEMS 1, 2 & 3.



NOTE:-
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT WHERE OTHERWISE SHOWN.

MILLIMETRES 1000 500 0 — METRES 1 2 3
SCALE

CASE NO. 61/WDO/SD/18.

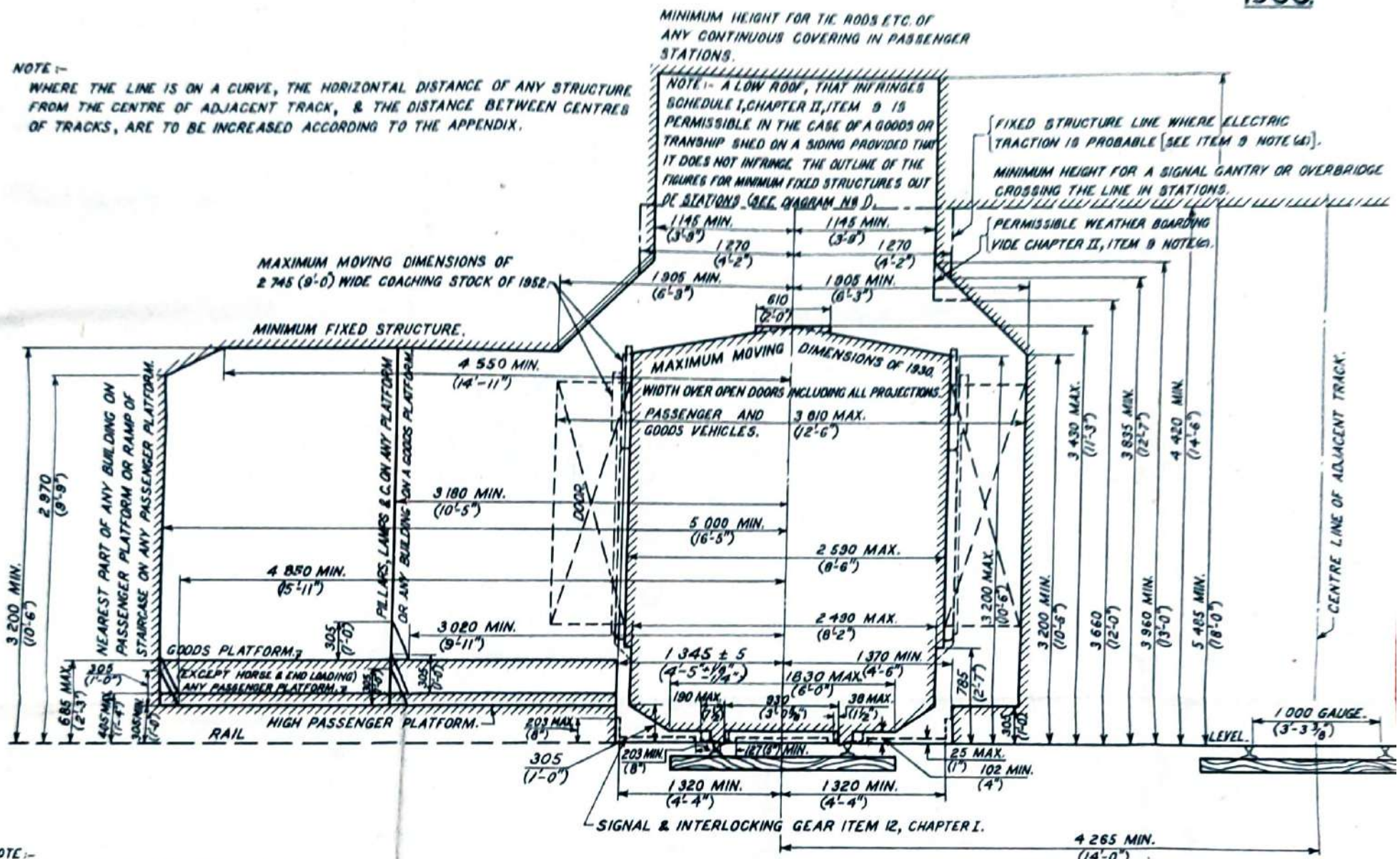
STANDARD DIMENSIONS IN STATIONS.

SCHEDULE I-CHAPTER II,

DIAGRAM Nº 2.

METRE GAUCE.

1960.



NOTE :-
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT WHERE OTHERWISE SHOWN.

MILLIMETRES 1000 500 0 METRES 1 2 3

SCALE

CASE NO. 61/MOD/3D/1

STANDARD DIMENSIONS IN STATIONS.

TO SUIT 25 kV.A.C. TRACTION, SCHEDULE I-CHAPTER I.

DIAGRAM Nº 2 MODIFIED.

METRE GAUGE.

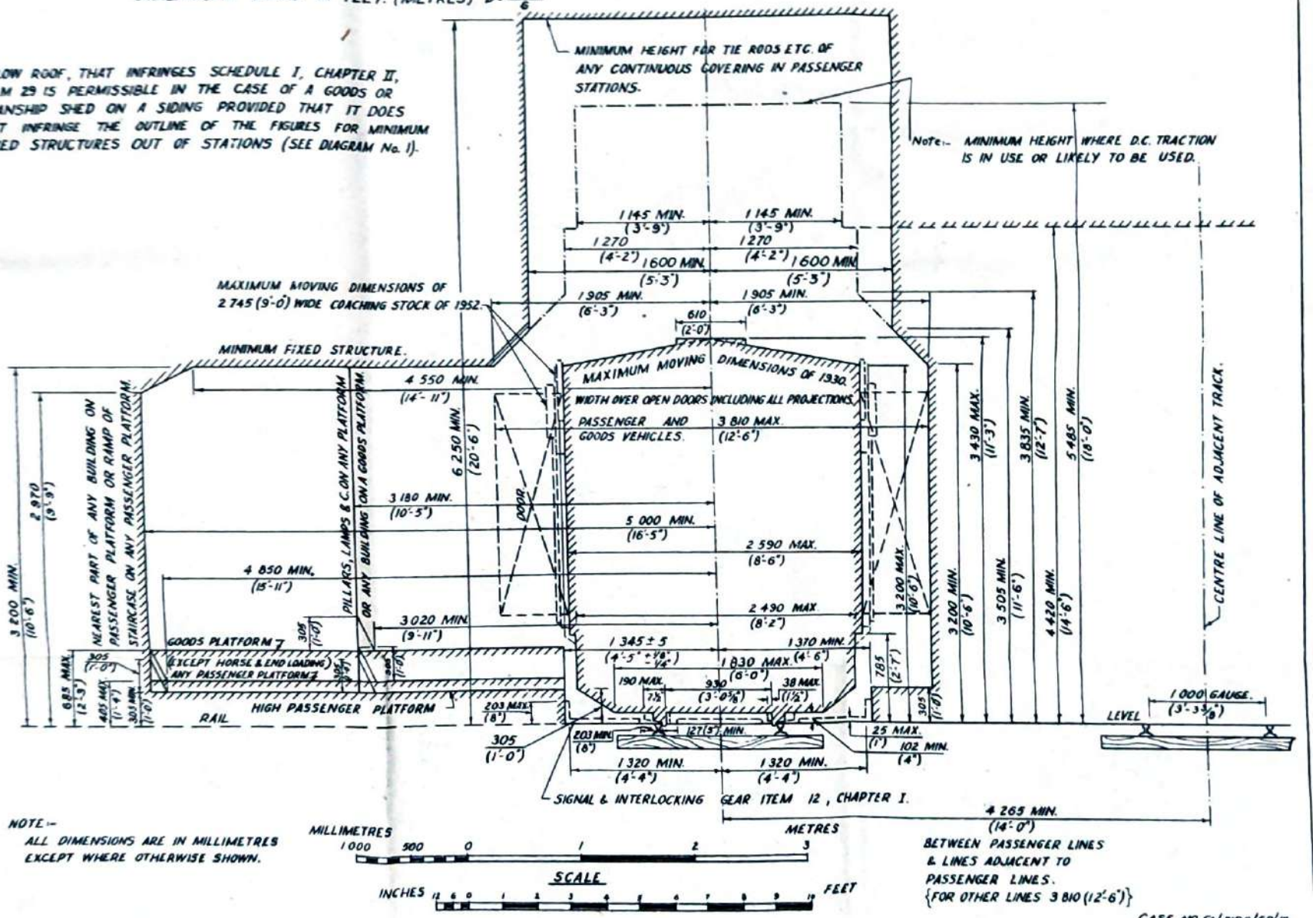
1962

NOTE:-

THE DISTANCE SPECIFIED APPLIES ONLY IN CASE OF STRAIGHT TRACK. ON CURVES, THE HORIZONTAL DISTANCES SHOULD BE INCREASED BY AN AMOUNT 'D' TO ALLOW FOR THE LEAN DUE TO SUPER-ELEVATION CALCULATED BY THE FOLLOWING FORMULA WHERE 'H' IS THE HEIGHT OF THE CONTACT WIRE. AND 'S' THE SUPER-ELEVATION AND 'G' THE GAUGE OF THE TRACK. ALL DIMENSIONS BEING IN FEET. (METRES) $D = \frac{H \times S}{G}$

NOTE:-

A LOW ROOF, THAT INFRINGES SCHEDULE I, CHAPTER II, ITEM 29 IS PERMISSIBLE IN THE CASE OF A GOODS OR TRANSHIP SHED ON A SIDING PROVIDED THAT IT DOES NOT INFRINGE THE OUTLINE OF THE FIGURES FOR MINIMUM FIXED STRUCTURES OUT OF STATIONS (SEE DIAGRAM No. 1).



NOTE:-

ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT WHERE OTHERWISE SHOWN.

SCALE

MILLIMETRES 1 000 500 0 1 2 3 METRES

INCHES 12 6 0 1 2 3 4 5 6 7 8 9 10 FEET

CASE NO. 61/MDO/30/18.

DRAWN BY:- A.S. SANDHU. CHECKED BY:-

SCHEDULE II.

RECOMMENDED DIMENSIONS FOR TUNNELS, OVERBRIDGES, THROUGH AND SEMI-THROUGH GIRDER BRIDGES.

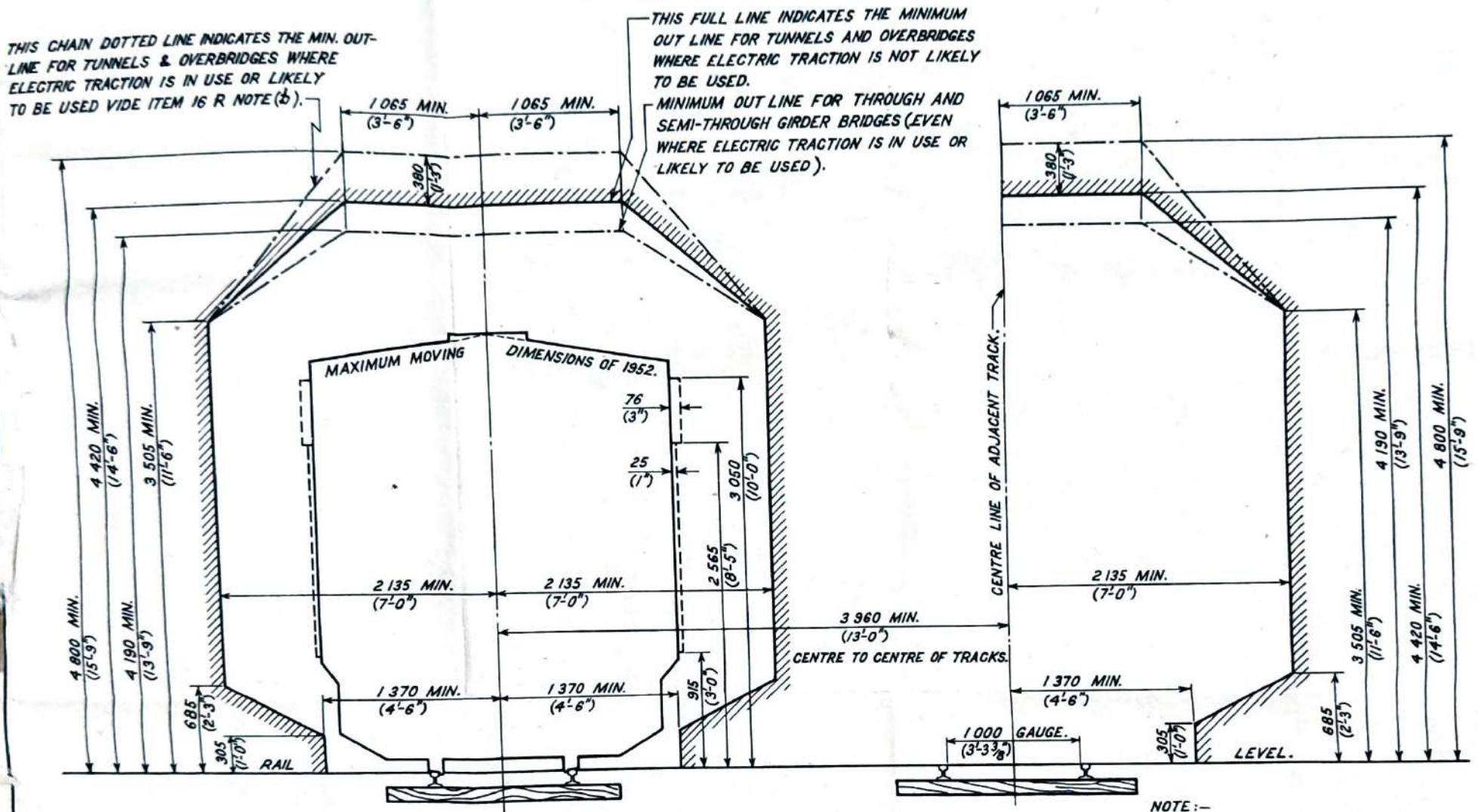
DIAGRAM Nº 2 A (REVISED).

METRE GAUGE.

1960

CHAPTER I-R GENERAL.

(ITEM 16 R.)



NOTE:-
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT WHERE OTHERWISE SHOWN.

MILLIMETRES 1 000 500 0 1 2 3 METRES

SCALE

NOTE:-
WHERE THE LINE IS ON A CURVE, THE HORIZONTAL DISTANCE OF ANY STRUCTURE FROM THE CENTRE OF ADJACENT TRACK, AND THE DISTANCE BETWEEN CENTRES OF TRACKS, ARE TO BE INCREASED ACCORDING TO THE APPENDIX.

CASE NO. 61/WDO/SD/18.

STANDARD DIMENSIONS FOR TUNNELS OVER-BRIDGES THROUGH AND SEMI-THROUGH GIRDER BRIDGES.

TO SUIT 25 kV. A.C. TRACTION, SCHEDULE II, CHAPTER I-R- GENERAL (ITEM-119-R).

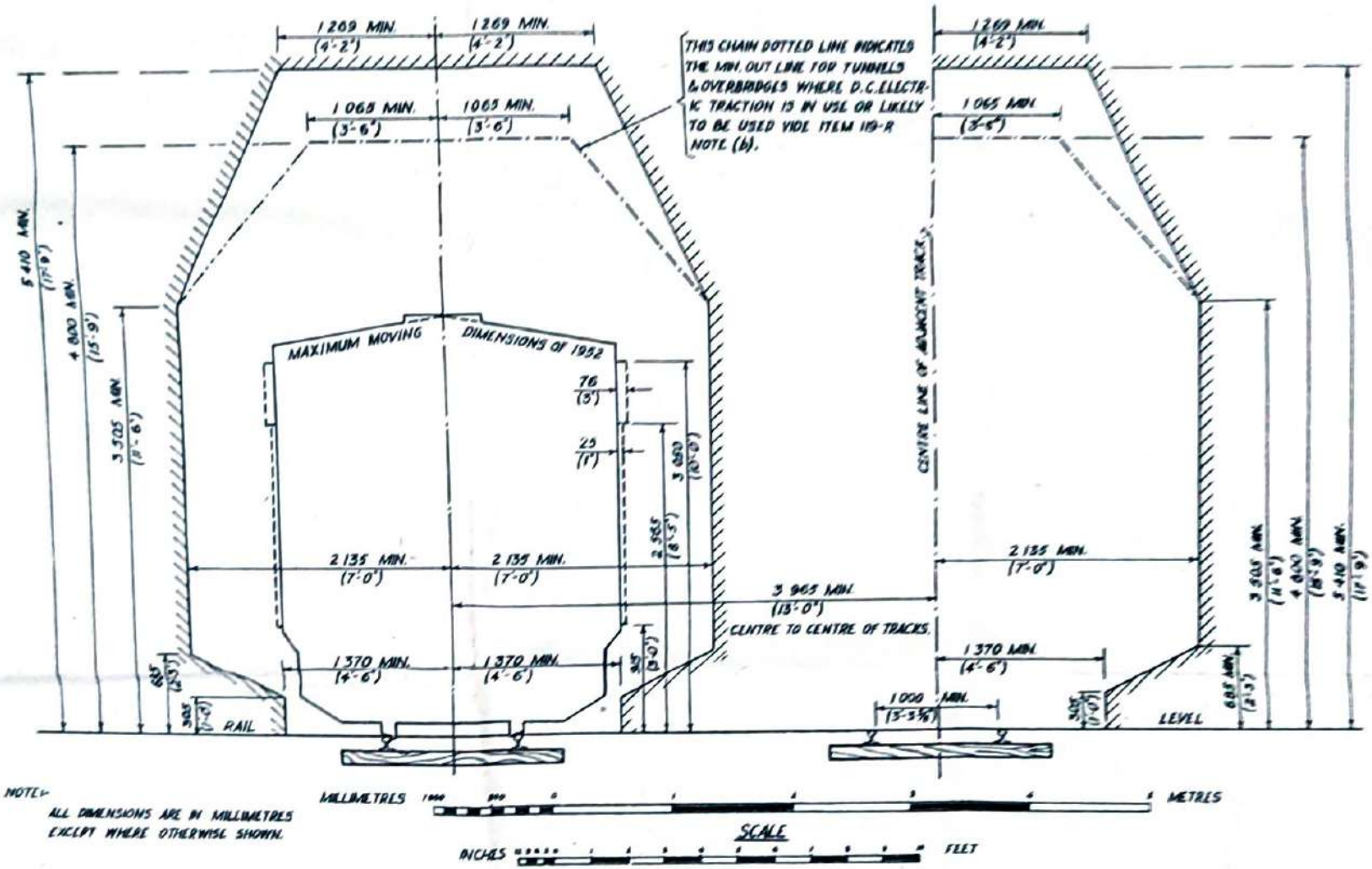
NOTE:-

THE DISTANCE SPECIFIED, APPLIES ONLY IN CASE OF STRAIGHT TRACK ON CURVES, THE HORIZONTAL DISTANCE SHOULD BE INCREASED BY AN AMOUNT 'd', TO ALLOW FOR THE LEAN DUE TO SUPER-ELLEVATION CALCULATED BY THE FOLLOWING FORMULA, WHERE 'H' IS THE HEIGHT OF THE CONTACT WIRE AND 'S' THE SUPER-ELLEVATION AND 'G' THE GAUGE OF THE TRACK ALL DIMENSIONS BEING IN METRES (FEET) $d = \frac{HxS}{G}$.

DIAGRAM NO. 2-A(REVISED) MODIFIED.

1000(3Ft.-3 3/8 In.) GAUGE.

1961



NOTE:-

ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT WHERE OTHERWISE SHOWN.

SCALE

MILLIMETRES 1000 500 0 1 2 3 4 5 METRES

INCHES 1 2 3 4 5 6 7 8 9 10 FEET

CASE No. 61/RDSO/SD/18

DRAWN BY:- A.S.SAXENA. CHECKED BY:-

MINIMUM CLEARANCES BETWEEN EXISTING STRUCTURES AND LARGEST ROLLING STOCK IN USE.

PERMITTED UNDER SCHEDULE III.

DIAGRAM No 3.
METRE GAUGE.
1960

FIG. I.
ON EXISTING GIRDER BRIDGES, ASPHITS ETC. OR WITH SPEED RESTRICTIONS OF 16 Km. (10 MILES) PER Hr. ITEM 4 (i), (ii) & (iii).

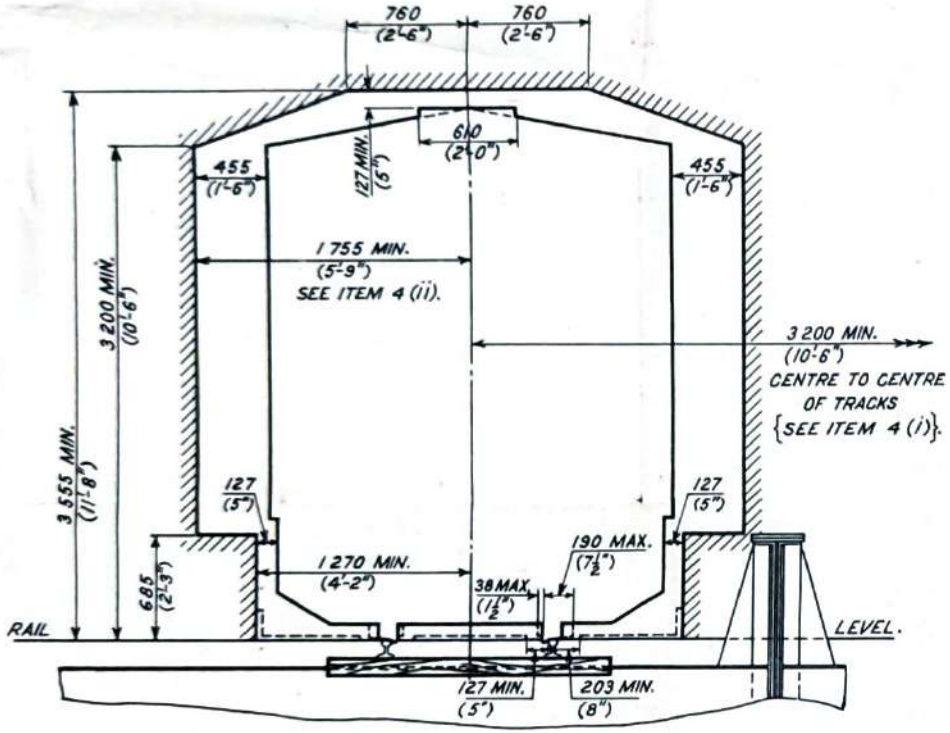
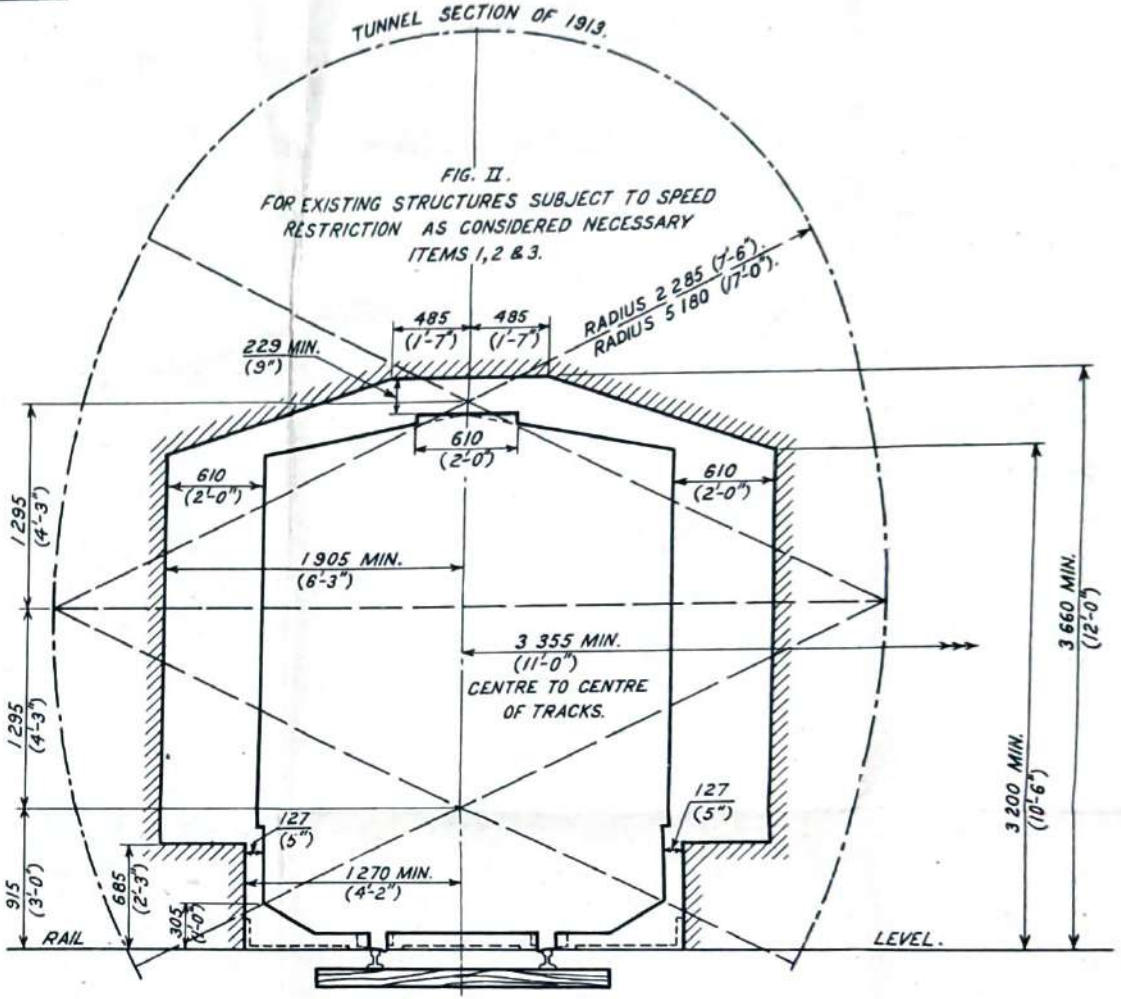


FIG. II.
FOR EXISTING STRUCTURES SUBJECT TO SPEED RESTRICTION AS CONSIDERED NECESSARY ITEMS 1, 2 & 3.



NOTE:-
ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT WHERE OTHERWISE SHOWN.

MILLIMETRES 1000 500 0 1 2 3 METRES
SCALE

CASE NO. 61/WDO/SD/18.