

Comparative statement of comments received from Zonal Railways /Directorates:

Clause No.	Existing Clause	Comments of Railways & Concerned Directorates.	RDSO Remark
2.1 (Part-I)	"Bond" means an electrical connection between two or more conductors or non-current carrying metallic parts of traction masts or structures or supports and rails.	<p>Southern Railway: Following is advised to add in the existing para–</p> <p>This shall be Galvanized steel flat of 40&6 mm instead of GS flat to avoid rusting and frequent replacement.</p>	Not accepted. As para is related with definition of traction bond.
2.9 (Part-I)	"Structure bond" means a bond connecting the non current carrying metallic parts of a traction mast or structure or support to the traction rail.	<p>Southern Railway: Para modified as below:</p> <p>"Structure bond" means a bond or stranded flexible GI wire connecting the non current carrying metallic parts of a traction mast or structure or support to the traction rail.</p>	Not accepted. As para is related with definition of traction bond.
2.12 (Part-I)	"Traction rail" means a non-track-circuited rail of a wired track, not required for signalling purposes and which may be earthed. In non-track-circuited sections, both the rails of wired track are traction rails and in single rail-track-circuited sections, the traction rail is the non-track-circuited rail.	<p>Southern Railway: Following is advised to add in the existing para–</p> <p>In double rail track circuited section, both the rails are track circuited and no traction rail will be available</p>	Not Accepted as impedance bonds are installed at insulated joints and also longitudinal bonds are provided to ensure low resistance path to distribute the traction return current in both the traction rails and to provide continuous path.
		<p>Signal Directorate: Para modified as below:</p> <p>"Traction rail" means a non-track-circuited rail of a wired track, not required for signaling purposes and which may be earthed. In non-track-circuited sections, both the rails of a wired track are traction rails and in single rail-track-circuited sections, the traction rail is the non-track circuited rail. one rail which is carry the traction return current.</p>	Not accepted for more clarity.

3.3 (Part-I)		Signal Directorate: Agreed with existing para (3.3.1 & 3.3.2) for Track-Circuited Sections	
3.3.2 (Part-I)	<p>In sections with double rail-track-circuits, both rails are longitudinally bonded to ensure a low resistance path for traction return and signalling currents; and also to distribute the return current more evenly in both the rails. Impedance bonds are installed at insulated joints to provide a continuous path to the traction return current. All track-circuited-rails are, in addition, provided with signal bonds.</p>	Southern Railway: Following is advised to add in the existing para— Earthing/cross bonding of traction return current will be done through the midpoint of impedance bonds	<p>Not Accepted as impedances bonds are provided for continuity of traction return current.</p>
3.4 (Part-I)	<p>Structure Bond: All non-current carrying metallic parts of traction masts or structures or supports or metallic parts of concrete/ wooden masts, supporting the traction overhead equipment shall be connected by means of a structure-bond to the nearest traction rail or to an earth wire run on the traction masts/ structures/ supports or to an earth. In the case of a portal structure, both legs of the portal shall be provided with the structure bond, whereas for head span masts, each mast of the head span shall be bonded to the traction rail nearest to it.</p> <p>Where traction masts or structures or supports are located on railway platforms and are bonded to the nearest traction rail, a cross-bond shall be provided at</p>	Southern Railway: Following is advised to add in the existing para— To avoid inconvenience to passengers at PF area & damage to PF floors for providing structure bonds, it is suggested to provide earth wire in station platform area. Earth wire is to be connected to all the structures of the same track and when the earth wire exceeds 1000 metres, it shall be made electrically discontinuous by providing a cut-in-insulator so that no section of the earth wire is greater than 1000 metres electrically. Each such section of the earth wire shall be connected to an earth at two traction masts or structures or supports at a distance not exceeding 500m apart. Earth wire shall be provided for each track separately. This will eliminate any damage & disconnection of bonds inside platform floor area, which could not be identified during foot patrolling.	<p>Accepted</p>

	the location of the structure-bond to connect the rail to the adjacent traction rail.	<p>Cross-bond shall be provided between the rails of the same track through impedance bond. Cross bonds shall be provided between the rails of different tracks in a double rail-track-circuited section at LCs, end of platforms at station area and at every 350 m in open route through impedance bonds. In station platform area, instead of structure bond at all locations, earth wire may be provided connecting all the structures of the same track.</p> <p>Flexible stranded structure bond with terminal lug may be provided alternatively at all places.</p>	<p>Not accepted as para is about structure bond only.</p> <p>Agreed with following modification: Alternatively flexible stranded steel structure bonds can also be used in theft prone areas.</p>
3.6.1 (Part-I)	All types of bond i.e. rail-bond, cross-bond and structure-bond shall be of mild steel of not less than 200 mm ² cross sectional area.	<p>Southern Railway: Following is advised to add in the existing para—</p> <p>Alternatively flexible stranded steel structure bonds can also be used.</p>	<p>Not accepted Already mentioned in clause 3.4.</p>
3.6.6 (Part-I)	The bond for connecting return conductor to the traction rail through the buried rail shall normally be made with GI nuts and bolts with spring washer and check nuts.	<p>Southern Railway: Para modified as below: The bond for connecting return conductor to the traction rail through the buried rail shall normally be made with GI/Galvanised steel nuts and bolts with spring washer and check nuts.</p>	<p>Accepted.</p>
3.6.8 (Part-I)	-	<p>Southern Railway: Advised to add New Para 3.6.8 as below: It is seen that the corrosion of structure bonds, polarity and cross bonds takes place due to effluents from Bio-Toilets</p>	<p>Coating of anti corrosive paint is mentioned in the drawing of Bonds</p>

		coaches which are from rail edge to sleeper edge (40 to 60 cm). This area needs special treatment. Typically sleeve or extra coat of special anti corrosive paint can be provided. Portion of Structure bond, Polarity bond, Transverse bond & Cross bond between rail and edge of the concrete sleeper, (approximate 60cm in from Rail) are getting heavily rusted. To avoid frequent replacement of bonds due to the rusting in a particular small portion, double coating of anti corrosive paint is required to be applied on all the bonds coming between rail and sleeper edge. Alternatively, a covering by insulation sleeve may be provided on all the bonds from rail to 60 cm length.	hence not included.
3.7 (part-I)		Signal Directorate: Agreed with existing para (3.7.1 & 3.7.2) for Bonding in Single Rail – Track-Circuited Sections	
-	-	Southern Railway: Advised to add New Para 3.7.3 in Part I as below: In single line section with more than one track, whether or not doubling of the section is foreseen in the future, provided with single rail-track-circuit, the non-track-circuited rail shall be provided with rail-bonds over the entire length and for a further 50 meters on both sides. The traction rails of such adjacent tracks shall also be provided with rail-bonds over the entire length of the track circuits and for further 50 m on both sides. In addition, the traction rail shall be cross-bonded to the traction rails of adjacent tracks wherever they exist at intervals of not less than 100 m. In case the length of a track-circuited rail is not more	Not accepted as already mentioned in Para 3.7.1.

		than 350 m, a cross-bond shall be provided between the rails of the track immediately outside the track circuited length at both of its end.	
3.8 (Part-I)	<p>In a double rail-track-circuited section, both the rails shall be provided with rail-bonds. At insulated joints of the double rail-track-circuit an impedance bond shall be provided. Since no traction rail is available for structure bonding, an earth wire shall be run on the traction mast or structure or support. In case, the length of the earth wire exceeds 1000m it shall be made electrically discontinuous by providing a cut-in-insulator so that no section of the earth wire is greater than 1000m electrically. Each such section of the earth wire shall be connected to an earth at two traction masts or structures or supports at a distance not exceeding 500m apart.</p> <p>No cross-bond shall be provided between the rails of the same track or between the rails of different tracks in a double rail-track-circuited section.</p>	<p>Southern Railway: Para renumbered as 3.8.1 and Following is advised to add in the existing para—</p> <p>Cross-bond shall be provided between the rails of the same track through impedance bond. Cross bonds shall be provided between the rails of different tracks in a double rail-track-circuited section at LCs, end of platforms and trolley path at station area and at every 350 m in open route through impedance bonds.</p> <p>Signal Directorate:</p> <p>Agreed with existing para for Bonding in Double Rail – Track-Circuited Sections</p>	<p>Not Accepted as impedances bonds are provided for continuity of traction return current.</p>
		<p>Southern Railway: Advised to add New Para 3.8.2.1 & 3.8.2.2 as below:</p> <p>Traction Bonding in Audio Frequency Track Circuited area :</p> <p>3.8.2.1 In AFTC with double rail track-circuited section, both the rails shall be provided with rail-bonds. At insulated joints of the double rail-track-circuit an impedance bond shall be provided. Since no traction rail is</p>	<p>Not Accepted as impedances bonds are provided for continuity of traction return current. Bonding in double track circuit is given in</p>

		<p>available for structure bonding, an earth wire shall be run on the traction mast or structure or support. In case, the length of the earth wire exceeds 1000 metres, it shall be made electrically discontinuous by providing a cut-in-insulator so that no section of the earth wire is greater than 1000 metres electrically. Each such section of the earth wire shall be connected to an earth at two traction masts or structures or supports at a distance not exceeding 500m apart.</p> <p>Cross bonds shall be provided between the rails of different tracks in a double rail-track-circuited section at LCs, end of platforms and trolley path at station area and at every 350 m through impedance bonds.</p>	<p>Para 3.8(part-I)</p>
		<p>3.8.2.2 In AFTC with single rail track-circuited section, structure bonds shall be provided to the nominated traction rail by the Signal Dept. Cross bonds shall also be provided between the rails of different tracks at every 100 m in station area, at LCs, end of platforms and trolley path at station area and at every 350 m in open route through impedance bonds.</p>	<p>Not Accepted as bonding in Single track circuit is given in Para 3.7 (part-I) .</p>
<p>3. 9.1 (part-I)</p>	<p>Bonding Adjacent to Traction Sub-Station/Feeding Post: Commencing opposite to a traction sub-station/feeding post, all the traction rails shall be provided with rail-bonds for a distance of 1000m on either side of the traction sub-station/feeding post. In addition, these traction rail shall be cross-bonded at approximate distances of 300, 500, 700</p>	<p>Southern Railway: Para modified as below: Bonding Adjacent to Traction Sub-Station/Feeding Post: 3 9.1 Commencing opposite to a traction sub-station/feeding post, all the traction rails shall be provided with rail-bonds (Style-02 bond with two holes on each side) for a distance of 1000 metres on either side of the traction sub-station/feeding post. In addition, these traction rails shall be cross-bonded with</p>	<p>Not included as already mentioned in the drawing.</p>

	and 1000m from the traction sub-station/feeding post on both sides of the traction-station/feeding post.	adjacent tracks at approximate distances of 300, 500, 700 and 1000 meters from the traction sub-station/feeding post in single rail track circuited section. In double rail track circuited section, these traction rails shall be cross-bonded with adjacent tracks at approximate distances of 300, 500, 700 and 1000 meters from the traction sub-station/feeding post through impedance bonds.	Not accepted. Not accepted as no cross bonding is allowed in double rail track circuit section.
3.13 (Part-I)	Bonding at a Level Crossing All the traction rails shall be provided with cross-bonds at only one location which shall be within five meters from either of the transverse edges of the level crossing.	Southern Railway: Following is added in the existing Para: In double rail track circuited section, cross bond shall be provided between traction rails of adjacent tracks through impedance bonds. Cross bond shall be provided at the traction supply feeding end of the section. Pedestal of the lifting barrier should be connected to traction rail with two strips of GS flats. If it is double rail track circuited section, each pedestal to be connected to an earth pit with two GS flats. Wire ropes of the lifting barrier should be provided with insulators. Gate lodge to be connected to traction rail with one GS flat. In station area, wherever trolley path is available for passenger to cross the track, cross bond shall be provided within 5 m towards the traction supply feeding end.	Not accepted as no cross bonding in double track circuit.
3.15 (Part-I)	All exposed metallic parts such as platform structures sheds, metallic fencing, wires, pipes and such other items, not likely to come into direct contact with the 25 kV a.c. overhead equipment and located within a distance of 20 m	Southern Railway: Para is modified as below: All exposed metallic parts such as platform structures/sheds, metallic fencing, wires, pipes and such other items, not likely to come into direct contact with the 25kV ac overhead equipment and located with a distance of 20 m	

	<p>from the nearest electrified track and running parallel to it for a distance of more than 20 m but less than 350 m shall be connected to traction rail. If parallelism with the nearest electrified track exceeds 350 m, all such exposed metallic parts shall be connected to a separate earth at distances not exceeding 350 m apart.</p> <p>No special precaution is required in case such metallic parts are fitted on metallic supports direct buried in the ground if the natural earth resistance of such metallic support is less than 10 ohm.</p>	<p>from the nearest electrified track and running parallel to it for a distance of more than 20 m but less than 350 m shall be connected to an earth in double rail track circuited section or traction rail in single rail track circuited section with two GS flats one on each side. If parallelism with the nearest electrified track exceeds 350 m, all such exposed metallic parts shall be connected to a separate earth with two GS flats at distances not exceeding 350 m apart.</p> <p>No special precaution is required in case such metallic parts are fitted on metallic supports directly buried in the ground if the earth resistance of such metallic support is less than 10 Ohm.</p>	<p>Not accepted. Already mentioned in relevant clause.</p> <p>Accepted.</p>
3.17 (Part-I)	<p>Bonding of Over Line Structure</p> <p>The metallic parts of foot or road over-bridges or other over-line structures over wired tracks shall be connected either to a traction rail or to an earth by means of two mild steel strips/flats of cross-section not less than 200 mm² each. Touch and accessible voltages shall not exceed those stated in IEC-62128-1-2013</p>	<p>Southern Railway: Para is modified as below:</p> <p>Bonding of Over Line Structure</p> <p>The metallic parts of foot or road over-bridges or other over-line structures over wired tracks shall be connected to an earth in double rail track circuited section or traction rail in single rail track circuited section by means of two mild steel strips/flats of cross-section not less than 200 mm² each.</p> <p>Mild steel strip/flat may be connected from the legs of the bridges at each platform when connected to traction rail.</p>	<p>Not accepted. Already mentioned in relevant clause.</p> <p>Not accepted.</p>
5 i) (Part – I)	<p>i) Guidelines for provisions of OHE Mast for Electrification at New and Existing Bridge Pier/Abutment (Report No. BS-121)</p>	<p>Southern Railway: Modified as below:</p> <p>i) Guidelines for provisions of OHE Mast for Electrification at New and Existing Bridge Pier/Abutment (RDSO Report No. BS-121)</p>	<p>Accepted.</p>
1.0 (Part-II)	<p>In a tunnel all the traction rails shall be provided with</p>	<p>Southern Railway: Modified as below:</p>	

	<p>rail-bonds not only over the entire length inside the tunnel but also for a length of upto 50m on both sides outside the tunnel. Besides, a cross-bond shall be provided between the traction rails at both ends of the tunnel.</p>	<p>In a tunnel all the traction rails shall be provided with rail-bonds not only over the entire length inside the tunnel but also for a length of upto 50 m on both sides outside the tunnel. Besides, a cross-bond shall be provided between the traction rails at every 100 m inside the tunnel and at either ends of the tunnel.</p>	Accepted.
1.1 (Part-I)	<p>Bonding in Single Rail Track-Circuited Sections</p>	<p>Agreed with existing para for Bonding in Single Rail – Track-Circuited Sections</p>	
1.2 (Part-II)	<p>Bonding in Double Rail Track-Circuited Sections</p> <p>In a double rail-track-circuited section, both the rails shall be provided with rail-bonds. At insulated joints of the double rail-track-circuit an impedance bond shall be provided. Since no traction rail is available for structure bonding, an earth wire shall be run on the traction mast or structure or support. In case, the length of the earth wire exceeds 1000m it shall be made electrically discontinuous by providing a cut-in-insulator so that no section of the earth wire is greater than 1000m electrically. Each such section of the earth wire shall be connected to an earth at two traction masts or structures or supports at a distance not exceeding 500m apart.</p> <p>No cross-bond shall be provided between the rails of the same track or between the rails of different tracks in a double rail-track-circuited section.</p>	<p>Southern Railway: Para modified as below:</p> <p>Bonding of rails inside tunnel in Double Rail Track-Circuited Sections</p> <p>In a double rail-track-circuited section, both the rails shall be provided with rail-bonds. At insulated joints of the double rail-track-circuit an impedance bond shall be provided. Cross bonds between rails/tracks shall be provided at every 100 m through impedance bond. Since no traction rail is available for structure bonding, an earth wire/GS flat at suitable level shall be run on the traction mast or structure or support or tunnel side wall. In case, the length of the earth wire/GS flat exceeds 1000m it shall be made electrically discontinuous by providing a cut-in-insulator so that no section of the earth wire/GS flat is greater than 1000m electrically. Each such section of the earth wire/GS flat shall be connected to an earth at two traction masts or structures or supports at a distance not exceeding 500m apart.</p> <p>Cross-bond shall be provided between the rails of the same track or between the rails of different tracks in a double rail-</p>	<p>Not Accepted. Cross Bonding not allowed.</p> <p>Not accepted.</p> <p>Not accepted. Cross Bonding not allowed.</p>

		<p>track-circuited section through impedance bond.</p> <p>Signal Directorate: Agreed with existing para for Bonding in Double Rail – Track-Circuited Sections</p>	
1.3.1 (Part-II)	<p>For Bonding in Non track circuited section, Single & Double track circuited section, procedure given in para 1.0, 1.1 & 1.2 shall be followed. For each track, an earth wire connecting all non-current carrying metallic parts which form parts of the supports for the overhead equipment, shall be run inside the tunnel. The earth wire shall be connected to an earth as well as to the traction rails at both ends just outside the tunnel. In case, all the rails are track circuited, the earth wire shall be connected to an earth at both ends Just outside the tunnel. If the length of the earth wire exceeds 1000 m, the stipulation in regard to making it electrically discontinuous may be examined if the earth wire is local and not a part of the return current circuit. If the length of the earth wire exceeds 1000 m, it shall be made electrically discontinuous by providing a cut-in-insulator so that no section of the earth wire is greater than 1000m electrically. Each such section of the earth wire shall be connected to an earth at two traction masts or structures or supports at a distance not exceeding 500m apart.</p>	<p>Southern Railway: Para modified as below:</p> <p>For Bonding in Non-track circuited section, Single & Double track circuited section, procedure given in para 1.0, 1.1 & 1.2 shall be followed. For each track, an earth wire/GS flat connecting all noncurrent carrying metallic parts which form parts of the supports for the overhead equipment, shall be run inside the tunnel. The earth wire/GS flat shall be connected to an earth as well as to the traction rails at both ends just outside the tunnel. In case, all the rails are track circuited, the earth wire/GS flat shall be connected to an earth at both ends just outside the tunnel. If the length of the earth wire/GS flat exceeds 1000 m, the stipulation in regard to making it electrically discontinuous may be examined if the earth wire/GS flat is local and not a part of the return current circuit. If the length of the earth wire/GS flat exceeds 1000 m, it shall be made electrically discontinuous by providing a cut-in-insulator so that no section of the earth wire/GS flat is greater than 1000m electrically. Each such section of the earth wire/GS flat shall be connected to an earth at two traction masts or structures or supports at a distance not exceeding 500m apart.</p>	Not Accepted.

1.3.2 (Part II)	In a tunnel, a cross bond shall be provided between the traction rails at both ends of the tunnel and provided with a local earth. The traction rail shall be cross-bonded to the traction rails, if any, of adjacent tracks wherever they exist at intervals of not more than 100m. If the tracks in a tunnel are single track-circuited, the typical drawing is given in Anexxure-I.	Southern Railway: Para modified as below: In a tunnel, a cross bond shall be provided between the traction rails at every 100 m and both ends of the tunnel and provided with a local earth. The traction rail shall be cross-bonded to the traction rails, if any, of adjacent tracks wherever they exist at intervals of not more than 100m. If the tracks in a tunnel are single track-circuited, the typical drawing is given in Annexure-I.	Accepted.
2.2 (Part-II)	In a single rail-track-circuited section, the non-track-circuited rail which is the traction rail shall be provided with rail-bonds (refer clause 1.1 Part - II) and connected to an earth at both ends of the bridge. The connection of the non-track-circuited rail to each of the earths shall be made by two separate mild steel strips/flats each of cross-section not less than 200 mm ² .	Southern Railway: Following is added in the existing Para : The steel structures of the girders should be interconnected with each other with 2 nos. GS flats. Guard rails/check rails & running rails of traction rails shall be interconnected by GS flats at every 100 m.	Accepted.
3.1 (Part-II)	Bridge mast/structures shall be connected to a traction rail or to an earth by means of two mild steel strips/flats of cross-section not less than 200mm ² each. The traction rails (where there are two or more such rails) on the bridge shall be connected by cross-bonds at distances not exceeding 100 metres apart.	Southern Railway: Para modified as below: Bridge structures shall be connected to a traction rail or to an earth by means of two mildsteel trips/flats of cross-section not less than 200mm² each. Bridge mast shall be connected to a traction rail by means of one GS flat or to an earth by means of two GS flats of cross-section not less than 200mm² each. The traction rails (where there are two or more such rails) on the bridge shall be connected by cross-bonds at distances not exceeding 100 metres apart.	Not included. Already mentioned Bridge mast/structures.
-	-	Southern Railway: Suggested to incorporate at 4.0 Bonding of	

		<p>Rail & Structures on continuous elevated structures: (followed in Chennai Beach-Velacheri MRTS)</p> <p>4.1 Ballasted track with single rail track circuit—</p> <ul style="list-style-type: none"> i) Structure bonds to be connected to traction rail ii) Earth wire to be provided and connected to earth pits as per standards iii) Cross bonding to be provided between tracks at every 100 m <p>4.2 Ballast less track with double rail AFTC track circuit :</p> <ul style="list-style-type: none"> i) GS flat of 50X6 mm size shall be run throughout the elevated portion of track separately for up and down tracks and connected to plinth beam reinforcement of up and down track. Each earth flat shall be made discontinuous at every 1 km and connected to separate earth and at each end. ii) Each OHE structure shall be connected to 50X6 mm GS flat as run above. iii) In addition, an earth wire (electrically connected to each OHE structure) shall be run through the elevated portion of track and earthed as applicable as per standards. iv) 160X40X8 mm GS flat shall be welded to plinth reinforcements for electrical continuity. v) Each plinth beam is connected with a copper cable of 35 mm². This shall 	<p>Included</p> <p>Not included as B & S Dte. not agreed.</p> <p>Agreed</p> <p>Not included as B & S Dte. not agreed.</p>
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		<p>be made discontinuous at every 1 km and connected to a separate earth.</p> <p>4.3 Ballast less track with single rail AFTC track circuit :</p> <ul style="list-style-type: none"> i) Structure bond to be connected to one rail. ii) Impedance bond or Z/S bond between rails may be provided at every 1.5 to 2.0 km. iii) Cross bonding of impedance bonds may be done between up and down tracks at every 350 m. iv) GS flat of 50X6 mm size shall be run throughout the elevated portion of track separately for up and down tracks and connected to plinth beam reinforcement of up and down track. Each earth flat shall be made discontinuous at every 1 km and connected to separate earth and at each end. 	<p>Agreed.</p> <p>Not agreed.</p> <p>Not agreed</p> <p>Not included as B & S Dte. not agreed.</p>
<p>4.0</p>	<p>All exposed metallic parts such as platform structures sheds, metallic fencing, wires, pipes and such other items, not likely to come into direct contact with the 25 kV a.c. overhead equipment and located within a distance of 20 m from the nearest electrified track and running parallel to it for a distance of more than 20 m but less than 350 m shall be connected to traction rail. If parallelism with the nearest electrified track exceeds 350 m, all such exposed metallic parts shall be connected to a</p>	<p>Southern Railway: Para modified as below:</p> <p>All exposed metallic parts such as platform structures sheds, metallic fencing, wires, pipes and such other items, not likely to come into direct contact with the 25 kV a.c. overhead equipment and located within a distance of 20 m from the nearest electrified track and running parallel to it for a distance of more than 20 m but less than 350 m shall be connected to traction rail in single rail track circuited section and to an earth by means of two GS flats in double rail track circuited section. If parallelism with the nearest electrified track</p>	<p>Accepted.</p>

	<p>separate earth at distances not exceeding 350 m apart.</p> <p>No special precaution is required in case such metallic parts are fitted on metallic supports direct buried in the ground if the earth resistance of such metallic support is less than 10 ohm.</p>	<p>exceeds 350 m, all such exposed metallic parts shall be connected to a separate earth at distances not exceeding 350 m apart. No special precaution is required in case such metallic parts are fitted on metallic supports direct buried in the ground if the earth resistance of such metallic support is less than 10 ohm.</p>	
3.6.5 (Part-II)	<p>Where it is not possible to provide a rail-bond a welded bond shall be used. The bond shall be connected to the rails by electric or gas welding.</p>	Track Directorate: Advised to delete the Para.	Accepted
		<p>Track Directorate: advised to include following:</p> <p>Hole drilled in the web of rail should be concentric with neutral axis of rail section and bond hole should be chamfered. The hole centre should be located minimum 170mm away from the centre of already existing hole, any in longitudinal direction. Sketch showing location of hole to be drilled in rail web at neutral axis and guidelines for drilling holes made in rail for connection of signal bonded wire and OHE carrying return currents to be added.</p>	Accepted
2.2 Part II		<p>B & S Directorate suggested following:</p> <p>Traction Rails are to be connected to an earth at both ends of the Bridge, whereas in figure at Annexure-II Track circuited Rail is shown to be connected to earth at both ends of the Bridge, this may be reviewed.</p>	Drawing Modified
Annexure II Part-II		<p>B & S Directorate suggested following:</p> <p>(i) Ground Level may be shown above the Earth Symbol for better clarity.</p> <p>(ii) Substructure part shown in</p>	Diagram modified

		the diagram should be pile cap in place of pier cap.	
3.0 Part-II		B & S Directorate suggested following: Earthing for Non track circuited non Traction Rails may also be provided.	Bonding of check rail and guide rail to traction rail through ms flat included in note t Annexure-II.
1.3 of Part-II	In a tunnel, a cross bond shall be provided between the traction rails at both ends of the tunnel and provided with a local earth. The traction rail shall be cross-bonded to the traction rails, if any, of adjacent tracks wherever they exist at intervals of not more than 100m. If the tracks in a tunnel are single track-circuited, the typical drawing is given in Anexxure-I .	Signal Directorate: Modified the para as below: In a tunnel, in case of single rail track circuit a cross bond shall be provided between the traction rails at both ends of the tunnel and provided with a local earth. The traction rail shall be cross-bonded to the traction rails, if any, of adjacent tracks wherever they exist at intervals of not more than 100m. If the tracks in a tunnel are single track-circuited, the typical drawing is given in Anexxure-I .	Accepted
3.2 of Part II	In a single rail-track-circuited section, the non-track-circuited rail which is the traction rail shall be provided with rail-bonds (refer clause 1.1-Part II) and connected to an earth at both ends of the bridge. The connection of the non-track-circuited rail to each of the earths shall be made by two separate mild steel strips/flats each of cross-section not less than 200 mm ² . Bonding of Rail & Mast/structure on Bridges on Single Track circuited section is shown in drawing at Annexure-II.	Signal Directorate: Modified the para as below: In reference to corrected definition in Para 2.12(part-I) above, para modified as below: In a single rail-track-circuited section, the non-track-circuited rail which is the traction rail shall be provided with rail-bonds (refer clause 1.1-Part II) and connected to an earth at both ends of the bridge. The connection of the non-track-circuited-rail traction rail to each of the earths shall be made by two separate mild steel strips/flats each of cross-section not less than 200 mm ² . Bonding of Rail & Mast/structure on Bridges on Single Track circuited section is shown in drawing at Annexure-II.	Not Accepted for more clarity.
Deleted para 4.4 of the code	A return conductor connecting Booster transformer shall be	Signal Directorate: Suggested following:	

<p>ETI/OHE/7 1 (part-I)</p>	<p>connected approximately at the mid point between the adjacent booster transformer stations to the traction rail of same track or to the mid point of impedance bond in case of double rail track circuited section</p>	<p>The deletion of this para needs a conscious view at Railway Board level as this may have an impact on signaling.</p>	<p>Para deleted as Booster Transformers are not used on IR.</p>
<p>PartII</p>	<p>Complete Part-II</p>	<p>Signal Directorate suggested following: Comments from zonal Railways where tunnels are there like Central Railway and NFR may also be taken for requirement of tunnel and bridges.</p>	<p>Earthing & Bonding code has been sent to zonal railways for comments. S. Railway comments received.</p>
		<p>South Eastern Railway Comments</p> <p>(i)Maintenance of existing bonding to be modified with cleaning of rusted contact surfaces provision of conducting grease and refitment at periodicity of 6 monts interval.</p> <p>(i) In view of increased traction currents, to advise for double hole at either end of the longitudinal bond as per RDSO drg ETI/OHE/P/7030 (style 02) at all locations and delete style 01 part with single hole.</p>	<p>Accepted.</p> <p>Not included.</p>