UGL REGIONAL LINX

TRACK CONSTRUCTION

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CRN CP 206

LINKING COMMUNITIES. CONNECTING CUSTOMERS.

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Document Control

Function	Position	Name	Date
Approver	A&E Manager	Lucio Favotto	28/12/2021

Revision	Issue Date	Revision Description
1.1	14/12/2021	UGLRL Operational Standards Template applied
2.0	28/12/2021	First approved and issued UGLRL version
3.0	28/12/2021	Published to Internet
4.0	29/08/2022	Version Correction

Summary of changes made from previous version

Section	Summary of change
All	This document is based on the previous rail infrastructure maintainer (RIM). Full revision history is available on request from UGLRL.

1 Scope and application

The specification documents model requirements for the construction of rail track to comply with CRN Engineering Standard CRN CS 200.

It is suitable for use as a general technical specification. Particular requirements may need to be added for specific works.

The specification provides a suite of requirements for track construction that can be included wholly, or in part, in a project specification. Some requirements may not be applicable and some good practice guidelines may be able to be achieved by other means.

Specific CRN Engineering standards, manuals and specifications are referred to in this specification. They are mandatory where applicable.

The specification DOES NOT include the following items that may be required in any particular contract:

- Commercial conditions
- Project management and supervision;
- Construction of earthworks, drainage or formation.
- Co-ordination of trackwork for main line connection within agreed possessions arranged by the Contractor with the Principal;
- Protection of rail traffic and CRN infrastructure during site works;

2 References

2.1 Australian and International Standards

Nil

2.2 CRN Documents

CRN CS 200 – Track System

CRN CS 210 – Track Geometry and Stability

CRN CS 220 – Rails and Rail Joints

CRN CS 230 – Sleepers

CRN CS 240 – Ballast

CRN CS 250 – Turnouts and Special Trackwork

CRN CS 410 – Earthworks and Formation

CRN CP 212 – Contract Survey Specification

CRN CM 001 – Civil Technical Competencies and Engineering Authority

CRN CM 202 – Track Fundamentals

CRN CM 222 – Rail Welding

CRN CM 223 – Rail Adjustment

CRN CM 224 – Rail Defects & Testing

CRN CM 241 – Ballast

2.3 Other References

Nil

2.4 Definitions

General Terminology in this specification is detailed in CRN CS 200

3 General requirements

The general specification for any project plan would normally include the following elements.

3.1 Project Quality Plan

The Project Quality Plan details how the Contractor will manage and control the quality of the work under the Contract. It shall be specific to the work under this contract.

Whilst other matters are required to be included in the Project Quality Plan, for the purposes of the works detailed in this specification the plan would include:

- Qualifications and competencies including currency of qualification of all staff, including sub-contractors, proposed to be used on the Contract;
- All work processes and equipment for all works as executed during production;
- Work method statements for all activities.
- Inspection and test plans.

3.2 Inspection and Tests

During the course of the work the Contractor needs to arrange for all relevant testing required by the Project Quality Plan and this Specification to be carried out by suitably qualified personnel.

All track measurements will be undertaken using the methods of measurement detailed in CRN Engineering Manual CRN CM 202.

Proposed Inspection and Test Plans (ITPs) shall be submitted for approval prior to any work commencing. Inspection and test plans should:

- Identify tests/inspections against Contract requirements including all referenced CRN Engineering standards;
- Identify records to be maintained or particular tests and/or inspections; and
- Detail test equipment to be used for specified tests and/or inspections.

3.3 Certification and records

It is a UGLRL CRN requirement that:

1. All materials and manufactured components supplied for the works shall meet the requirements of relevant CRN Engineering standards and specifications, and relevant Australian standards and shall be supplied together with such details and parameters required to be supplied by those documents and/or the Project Quality Plan.
2. The Contractor shall establish and maintain a system of records that provides objective evidence that the relevant requirements of CRN Engineering standards, manuals and specifications have been satisfied.

4 Approved design

Trackwork shall be constructed to an approved design that includes horizontal and vertical alignment, and, for turnouts and special trackwork, setting out details and timbering and plating details.

Track shall be constructed to meet the requirements of CRN Engineering Standards for the specified Track Classification (mainline or siding) as detailed in CRN CS 200 or the approved design.

5 Competency requirements

Trackwork shall be constructed and inspected by persons with competencies for work activities as detailed in CRN Engineering Manual CRN CM 001.

6 Formation standards

Before laying of the ballast and construction of the trackwork commences, the formation shall be finished to the appropriate standards shown in CRN Engineering Standard CRN CS 410.

Use of the formation as an access road shall be kept to a minimum and used only for material distribution and shall be used in such a manner to afford minimum damage to the capping, formation, ditches, shoulders and slopes. The capping material of the formation must not be disturbed in any way.

Transportation and distribution of materials and construction of track shall be suspended if the formation is too wet to enable works to proceed.

7 Survey

The Contractor, prior to the commencement of trackwork, shall establish a survey framework for the complete railway works in accordance with the requirements of CRN Engineering Standard CRN CS 210 and CRN Engineering Specification CRN CP 212. Track centrelines and turnouts shall be pegged out making full use of the survey information detailed in the design. All tangent points, points and crossings for turnouts and other significant geometric features shall be recovered by offset pegs and marking stakes clearly identifying the purpose and location of the peg. Offset centreline and level pegs shall be established as detailed in CRN CS 210.

The details of all offset pegs and stakes, including level and offset distance shall be recorded.

The Contractor shall be responsible for maintaining the survey controls and recovery pegs, including replacement of damaged pegs. All pegs and stakes placed for construction shall remain in place until final completion of the works.

The Contractor shall liaise with UGLRL CRN's surveyor on Control Points and local requirements.

8 Handling, transport and storage of materials

All rails shall be unloaded and transported and handled so as to prevent kinking, bending, bruising or any other damage. In unloading, the lengths of rail shall be placed with the head up, without dropping, and with sufficient support under the base to prevent bending.

Turnout and special trackwork materials, sleeper plates and other track components shall be handled so as to prevent bending, bruising or any other damage and shall be stored on bearers clear of the ground.

Sleeper jewellery and fasteners and other small materials shall be kept in their containers until the time of placing the rail. Threaded components shall be stored under waterproof cover.

Until required for distribution on the formation, sleepers and turnout bearers shall be stacked so as to avoid rapid drying out and non-uniform seasoning of the timber or damage to the steel or concrete. All timber shall be stored with heart face down and timbers in stacks shall be placed on suitable timber dunnage.

9 Ballasting

9.1 General

For the length of the track construction work bottom ballast material shall be supplied, placed and compacted to the profiles shown on the drawings, before sleepers and other track components are placed on the formation.

9.2 Ballast Material.

Ballast supplied shall conform to the requirements of CRN Engineering Standard CRN CS 240.

Sampling of ballast shall be undertaken at the source quarry, in stockpiles at the job site and in-track, in accordance with the methods specified in CRN Engineering Manual CRN CM 241.

9.3 Placing of bottom ballast layers

Bottom ballast shall be placed in two layers (each approximately the same depth) to allow for compaction; to the total height specified in CRN CS 240 for the nominated Track Classification (25 to 50) above the centre of the formation. This provides for the specified height to be achieved by the top ballasting, packing and finishing of the completed track work as detailed in Section 10.6. The ballast level is to be extended horizontally to the width shown on the drawings. The ballast shall be recessed so as to avoid centre binding of the sleepers.

A transition length shall be provided between varying ballast depths so that the change in depth does not exceed 25 mm per 5 metres.

9.4 Compaction of bottom ballast

The bottom ballast shall be compacted by a minimum of two passes of a 12 tonne (minimum) smooth wheel vibratory roller or its equivalent. Each pass of the roller shall overlap the previous pass by 20% and compaction shall take place over the full width of the bottom ballast.

9.5 Profile of bottom ballast

Where flat bottomed concrete sleepers are to be used, care needs to be taken to leave a ballast profile that does not cause centre binding (where the sleeper pivots about the centre)

10 Track laying

The section covers the construction of plain track on the prepared bottom ballast.

10.1 Preparation for laying

In plain track, rails shall be inclined at an angle of 1 in 20.

Track laying shall not commence on a section until bottom ballasting has been completed as specified.

The bearing surfaces of all sleepers, sleeper plates, pads, the bottom of rails and other bearing surfaces shall be clean and free of all dirt before rails are laid. Insulating pads shall be placed on each bearing surface of concrete sleepers.

Prefabricated material, as supplied, shall not be cut, bored or changed in shape to make it fit or join up except as required in the specification.

Rails and other materials shall not be heated, cut or welded with oxy/gas equipment or other methods except where specifically permitted in the relevant CRN Engineering Standards.

10.2 Sleepers

Sleepers supplied shall be in accordance with CRN Engineering Standard CRN CS 230.

10.2.1 Preparation of timber sleepers

Adzing of timber sleepers

The top of the sleepers shall be adzed flat and across its full width to a depth not greater than is necessary to ensure a full, smooth and even bearing under the sleeper plate to counter any wind or incorrect shaping of the sleeper. The entire area of the plates will bear evenly over the adzed surface.

All bearing surfaces shall be level and smooth, and those on any one sleeper shall all lie in the same plane. The distance from a level plane, to any point on any of the bearing surfaces of any one sleeper shall not exceed 2mm, and the separate adzed surfaces shall be so flat that a straight edge laid across them shall nowhere be more than 1.5 mm from the adzed surface. The location and length of the adzing shall permit a tolerance of 10mm in the location of the adzed area with relation to the holes.

Boring of holes

Where dogspiked, or timber resilient fastened, track is specified, the sleepers shall be bored for lockspikes and dogspikes as appropriate in each plate, to suit the rail size specified, using a template or jig that has been checked for gauge accuracy.

For plated track, the boring must suit the type of plate used.

The template shall be placed at a constant distance from one end of the sleeper.

Dogspike holes must be no closer than 50mm to the edge of the sleeper and entirely through the sleeper from top to bottom. Dogspike and lockspike holes are to be bored normal to the top surface of the sleeper, so that spikes may be driven vertically.

The holes shall be fixed so that each plate is located in the centre of the width of the sleeper. Reboring is not permitted except in sidings. If any reboring necessary to achieve the specified gauge shall be such that the plate is still completely on the sleeper and the new holes are not overlapping any existing holes. All old holes must be plugged with hardwood plugs.

10.2.2 Laying out of concrete, steel and timber sleepers

Sleepers shall always be handled and moved into position in such a way as to avoid damage or bruising.

Sleepers shall be laid out generally at centres as specified in CRN CS 230, heart side down, square to the centre line of straight track and radial to curved track. Variations in distance between sleepers shall not exceed the tolerances specified in CRN CS 230. On curves the spacing shall be measured on the outer rail.

10.2.3 Sleeper plates for timber sleepers

Where specified, double shouldered sleeper plates meeting the requirements of CRN CS 230 shall be fitted to timber sleepers before rail laying. One lockspike shall be lightly driven on the outside and at each plate before rail laying, to locate the plate. Care is to be taken to ensure that the plates are correctly located.

10.3 Rails

10.3.1 General

Only rails meeting the requirements of CRN Engineering Standard CRN CS 220 shall be used.

An industry accepted method of handling rail shall be used.

10.3.2 Straightness

Vertical camber and lateral kinks in free standing rail shall not exceed the limits described in CRN CS 220.

Where it is necessary to remove kinks, all rails shall be straightened by means of a rail press or bender in both lateral and vertical planes.

The last 600mm of each end of the rail shall be uniformly crowed to suit the radius of the curve for rails laid on curves sharper than 500m radius. Crows must not be used at or near an aluminothermic weld.

10.3.3 Cutting of rails

Rails shall only be cut using methods approved in CRN CS 220. Oxy-cutting of rails is not permitted except for aluminothermic welding where any oxy-cut face to be joined by aluminothermic welding must be formed on the same day as the weld is carried out.

Rails shall only be cut with a rail saw. Cuts shall be made square to the rail, both horizontally and vertically to tolerances detailed in CRN CS 220. Unnecessary cutting of rails should be avoided.

10.3.4 Drilling

When it is necessary to provide fishbolt holes in the rail web, such holes shall only be made by drilling, care being taken to ensure that the hole is drilled square to the web of the rail.

The diameter and position of the hole shall be in accordance with CRN CS 220.

Oxy cutting of bolt holes will not be permitted in any circumstances.

10.3.5 Laying of rails

The bearing surface of all sleepers or sleeper plates and the bottom of the rail shall be clean before the rails are laid.

The rails shall be set true to gauge to the tolerances specified in CRN CS 210 for track construction.

In manual rail laying, the line rail, (on tangent track the line rail is the right hand rail facing the direction of increasing kilometrage, on curves the line rail is the high, or outside, rail) shall be laid first, true to line as established by suitable lining instruments, before spiking or clipping up. After the line rail has been lined and fastened, the opposite rail shall be laid and lined to accurate gauge from the line rail.

In mechanised track laying, both rails may be laid at the same time.

10.3.6 Joints

There are restrictions on the placement of joints and aluminothermic welds in relation to bridges, turnouts, sleepers and other joints or welds. Joints and aluminothermic welds shall be placed in accordance with the requirements of CRN CS 220.

Rail joints are to be staggered in the centre of the space between sleepers.

Only the correct fishplate for the rail section shall be used as detailed in CRN CS 220.

The design expansion gap between jointed rails shall be 6mm at 35°C.

Fishplates and rail surfaces are to be cleaned before assembly.

Six (6) fishbolts shall be provided at all permanent rail joints, inserted alternately from each side, the spring washer is to be fitted behind each nut. Nuts shall be tightened without excessive force to just flatten the spring washer. The bolts used shall be of the correct size and length for the rail section in accordance with CRN CS 220.

Inner rail holes should not be drilled where the rail joints will be welded out.

Rails may be temporarily fished during construction by the use of four (4) outside bolts only.

10.3.7 Junction rails

Junction rails or approved junction welds shall be provided at each location where rails of different cross section have to be connected. The junction rails shall meet the requirements of CRN CS 220.

Where used in conjunction with welded rail track the junction rail shall be aluminothermically welded to the rail forming the track. If the junction rail is to connect rail track with mechanical joints, it shall be mechanically fishplated to that rail section.

The junction rails are to be located so that the changes in rail section are apposite each other. If it is necessary to cut rails to ensure this, the minimum length of loose rail left in the track must be 6m.

10.4 Rail welding

10.4.1 Welding

Rail welding shall be carried out in accordance with the requirements of CRN CS 220. Approved Aluminothermic welding processes are documented in CRN Engineering Manual CRN CM 222.

Aluminothermic welding may only be undertaken by welders who have been licensed by UGLRL CRN in accordance with the requirements of CRN CM 222 and CRN CM 001. This approval does not relieve the Contractor of any responsibility for the quality and satisfactory performance of the weld.

All welds shall be ultrasonically tested using the procedures detailed in CRN Engineering Manual CRN CM 224. Any defective weld found must be replaced.

Where a closure is to be welded into the track the minimum length of closure shall be 2.2m except where permitted in CRN CS 220. Where practical, 4m closures should be used.

If located on a radius sharper than 500m, the last 600mm on either end of the closure must be crowed to the correct radius before insertion in the track.

10.4.2 Bonded Insulated Joints

Only bonded insulated joints meeting the requirements of CRN CS 220 shall be used.

Bonded insulated joints shall be installed at locations nominated in the design drawings. Adjoining rails shall be cut in order to facilitate installation. The bonded insulated joint assembly shall be aluminothermically welded into position to meet the requirements of CRN CS 220.

When installation is required on curved track care must be taken that the correctly pre curved joints are installed.

The correct low profile fastenings, as detailed in CRN CS 220, shall be installed at the joint so that short circuiting of the insulation is avoided.

10.5 Fastenings

10.5.1 Resilient fastening application

The application of resilient fastenings shall be in accordance with the manufacturer's specification and CRN Engineering Standard CRN CS 230.

10.5.2 Driving of Dogspikes.

Where specified, sleepers and plates shall be spiked to each rail using two (2) dogspikes in accordance with the requirements of CRN CS 230. Dogspikes shall be started and driven perpendicular to the sleeper and square with the rail until the shank and underside of head are in contact with the rail and the rail is in contact with the sleeper. Care shall be taken to prevent over-driving.

Dogspikes bent while driving shall be removed. No dogspike shall be driven into an existing hole that has already fully held a dogspike.

Care shall be taken to avoid damage to rails during spiking and any rails so damaged shall be replaced.

Dogspiking shall be carried out with the sleeper in the correct lateral location and fully supported hard up under the rail. Dogspiking of unsupported sleepers will not be permitted.

10.5.3 Driving of Lockspikes.

Lockspikes shall be installed on each sleeper plate in accordance with the requirements of CRN CS 230.

Lockspikes shall be driven until approximately 30mm of the head remains above the plate. This will be when the bulge below the eye is nipped by the plate and the lower point of the eye has just entered the sleeper plate hole. They should not be over driven.

The lockspikes shall be installed with the hole in the eye parallel to the rails so that the spring action of the spike is along the sleeper length.

No spike shall be driven into an existing hole that has already held a lockspike.

The high rail plate on all curves and the line rail plate on straights shall be fully lockspiked first.

The low rail plate on curves and the gauged rail on straights shall not be fully lockspiked until both rails are in position and the rails adjusted to gauge. If necessary, the lightly driven lockspike is to be withdrawn before final driving to ensure correct gauge.

10.6 Top ballasting, packing and finishing

10.6.1 General

Top ballasting, packing and finishing shall be carried out and completed to the cross sections and levels shown on the design drawings.

The track shall be constructed to a satisfactory line and surface before it is used by any traffic. Extreme care shall be taken at all times during the laying of the track, and subsequent ballast lifts, to maintain adequate uniform support of the track structure and/or its components.

The Contractor shall ensure that no damage occurs as the result of the passage of traffic before ballasting and final surfacing is completed. Any damage to rail or track components caused by the Contractor's neglect to comply with this requirement shall be repaired and/or the damaged units replaced.

10.6.2 Track Subject to Traffic

The Contractor shall maintain the new track in proper alignment and surface until the work is completed and accepted. The amount of open or skeleton track either before or during ballasting shall be kept to a minimum with support ballast being placed as soon as possible to minimise disturbance to alignment and other rail movement resulting from track temperature variation.

10.6.3 Ballasting

Only ballast meeting the requirements of CRN Engineering Standard CRN CS 240 shall be used.

Ballast shall not be laid out until the track is on the correct alignment and in readiness for lifting to the finished levels.

Ballast shall be laid out so as not to disturb the bottom ballast or damage the positioned track.

Top ballast shall preferably be laid out from rail wagon hoppers. If hoppers are used, ballast shall be unloaded and distributed by ploughing as required. Unloading of ballast shall be carefully controlled by having one or more wagons opened at a time, allowing the proper amount of ballast material as required for the specific rise to be made at the point of unloading, to flow out as the work train is moved along slowly.

The unloaded material shall be levelled; and distributed preferably by means of a ballast plough wagon and care shall be taken to avoid destruction or disturbance of survey pegs.

10.6.4 Tamping

The track shall be brought to height as necessary and accurately packed to line, level and superelevation nominated by the design in accordance with the acceptance standards nominated in CRN CS 210.

The maximum lift of the track in one lift shall be 50mm, allowing for potential settlement between lifts.

When lifting track by jacking, the jacks shall be spaced no further apart than every fourth sleeper to ensure uniform tamping and running surface and to prevent undue bending of rail and strain on joints and welds.

The ballast shall be tamped by means of mechanical tampers of approved type so that ballast to a distance of 450mm on each side of the centreline of each rail and under the full width of the sleeper is properly consolidated.

Regardless of the type of power tamper used, two tamping tools should always be worked opposite each other on the same sleeper.

10.6.5 Dressing

The ballast shall be vibration compacted by a suitable method. As far as possible this work is done in association with tamping and lining operations.

After the final lift has been tamped, the track shall be filled with any additional ballast required, and the ballast section dressed by whatever shaping methods are necessary to meet the ballast profile requirements of CRN CS 240.

The top surface of the shoulders shall be an extension of the top line of the sleepers, and shall not be less than the ballast shoulder width specified in CRN CS 240.

The top of the sleepers shall be swept clear of ballast on completion of the work.

Where equipment or structures intrude into the ballast shoulder section the ballast shall be finished neatly around the obstruction leaving no gaps at the edge of the obstruction and removing any spilled ballast.

10.6.6 Access to completed trackwork

After laying top ballast, access across or along ballasted track will not be permitted by rubber tyred or tracked vehicles.

10.7 Welded rail adjustment

On completion of all tamping and lining, the rails are to be correctly adjusted in accordance with CRN Engineering Manual CRN CM 223 and welded using the methods described in CRN CM 222 into lengths as specified to provide a stress free condition at 35°C.

Records specified in CRN CM 222 and CRN CM 223 shall be made by the Contractor.

Where Continuously Welded rail (CWR) is installed, creep monitoring points shall be installed in accordance with the requirements of CRN CS 220 using the procedures detailed in CRN CM 223.

On non-resilient fastened track, rail anchors meeting the requirements of CRN CS 220 shall be provided to the minimum standard laid down in CRN CS 220.

Rail anchors shall be properly applied in accordance with the manufacturer's requirements and must be in close contact with the sleeper face. Care shall be exercised to avoid over-driving or other damage.

Any anchors requiring adjustment on the rail shall be removed carefully to avoid damage and reinstalled to proper, close contact with the sleeper face. Anchors shall not be adjusted by driving along the rail.

10.8 Completion of work

On completion, the whole work shall be left neat and tidy. All cesses and drains shall be clear, all drainage shall be to the correct section and all damage shall be made good.

All surplus track materials shall be removed from site.

All surplus ballast shall be removed from the formation surface.

10.9 Certification of work

Survey checks shall be carried out to ensure the work is laid to the designed geometry and complies with the requirements of CRN CS 210.

Up to 20% of the track shall be selected for detailed measurement after a visual inspection. The sections selected shall include all track with visible faults.

For the purposes of measurement, the finished trackwork shall conform to the measurements and tolerances specified in CRN CS 210. Where minor deviations from the above standard exist and where those deviations represent less than 5% of the same measurement over any 100m of track and do not, in UGLRL CRN's opinion, significantly diminish the quality of the finished track geometry, the minor deviations may be accepted at UGLRL CRN's discretion.

Before any length of track is accepted for traffic use, all fastenings shall be checked and tightened or re-tensioned where necessary.

Any remedial work required to obtain the specified standards shall be carried out by the Contractor.

10.10 'Work as Executed' Drawings

Subsequent to Commissioning of the Works, as a condition precedent to the achievement of Practical Completion, the Contractor shall revise all drawings and documentation to show the Works as finally installed, modified and adjusted to achieve Commissioning to the satisfaction of the Superintendent.

The Contractor shall submit preliminary copies of the drawings for review and acceptance.

11 Assembly and installation of turnouts

11.1 General

This section details the requirements for the site assembly of prefabricated turnouts ready for laying into track and the installation of turnouts in track.

Most of the requirements for laying of plain trackwork as detailed in Section 10 apply to the assembly and installation of turnouts. Reference is made to appropriate sections as necessary.

Turnouts shall be assembled in accordance with the design drawings and to meet the construction tolerances detailed in CRN Engineering Standard CRN CS 250.

Prefabricated material, as supplied, shall not be cut, bored or changed in shape to make it fit or join up except as required in the specification.

11.2 Assembly site

The site chosen for assembly of the turnout shall be level.

11.3 Bearers

Turnout bearers supplied shall be in accordance with CRN CS 230.

Turnout bearers shall always be handled and moved into position in such a way as to avoid damage or bruising.

Timbers bearers and sleepers must be laid heart side down.

Turnout bearers shall be placed according to lengths and spacing as shown on the design drawing. Variations in distance between bearers shall not exceed the tolerances specified in CRN CS 250.

11.4 Rails

All rails in turnouts shall be laid vertical and run out to 1 in 20 cant by the use of cant reducing plates or by design of the bearer seat.

All bearing faces of rails, timbers and track plates shall be clean before assembly.

Switches shall be assembled so that switch tips are square across the running line. Switches shall bear evenly on all slide chairs and fit properly against the stockrail when closed. The bearing surfaces of all slide chairs shall be cleaned before switches are brought into use or tested.

Switch points and crossing intersections shall not vary more than 10mm from the design location.

Crossings shall be fixed with one leg in true alignment with the running line. Gauge and flangeways shall be to the dimensions and tolerances shown on the relevant drawings and CRN CS 250.

11.4.1 Rail joints

All joints in the turnouts shall be aluminothermically welded and as many joints as practicable shall be welded at the assembly stage. All other joints are to be suitably held together with plates and approved clamps, or fishplates arid bolts if there are bolt holes in the end of the rails.

Where permanent mechanical joints are required by the design they shall be installed in accordance with the requirements of Section 10.3.6.

The remaining mechanical joints shall be aluminothermically welded as soon as practicable after installation of the turnout in the main line.

Where bonded insulated joints are required by the design they shall be installed in accordance with the requirements of Section 10.4.2.

11.4.2 Cutting and drilling of rails.

Rails shall only be cut and drilled using the methods detailed in Sections 10.3.3 and 10.3.4.

11.4.3 Rail welding

See Section 10.4.1.

11.5 Fastenings

11.5.1 Baseplates

Baseplates shall bear fully and truly on the tops of all bearers. Timber bearers shall, if necessary, be adzed so as to ensure that bearing surfaces are flat, smooth and in the same plane. Timbers shall be correctly bored for fastenings.

Baseplates shall be fastened to the rail and bearers with fastenings specified in the design.

11.5.2 Boring of spike holes and driving spikes

See Sections 10.2.1 and 10.5.2.

11.6 Measurement of turnout assembly

After assembly, prior to installation in track, the turnout shall be check measured to ensure the turnout measures as shown on the design drawings.

The assembled turnout shall also comply with the appropriate construction standards detailed in CRN CS 250.

11.7 Preparation for new turnout for installation

The assembled turnout shall be broken into sections suitable for transport to the installation site. Lifting and transport methods shall be designed to minimise bending and possible crippling of the turnout components.

11.8 Preparation for track for turnout installation

The existing trackwork, ballast and formation shall be removed.

New formation shall be prepared in accordance with the requirements of Section 6.

Bottom ballast shall be laid in accordance with Section 9.

11.9 Turnout installation

The sections of pre-assembled turnout shall be laid on the bottom ballast.

The sections shall be joined temporarily with plates and ‘G' clamps or fishplates arid bolts if there are bolt holes in the end of the rails.

11.10 Top ballasting, packing and finishing

Turnouts shall be ballasted, tamped and lined to the same standards as plain track as detailed in Section 10.6.

Every rail in the turnout shall be tamped for a distance of 450mm on each side of the centreline of each rail and under the full width of the turnout timber.

Around the crossing and elsewhere where standard tamping tools will not fit between rails, special equipment shall be used to hand tamp.

11.11 Rail welding

On completion of all tamping and lining, the rails are to be welded using the methods described in CRN Engineering Manual CRN CM 222.

11.12 Completion of work

See Section 10.8.

11.13 Certification of work

After installation the turnout shall be measured for compliance to the design drawings and to the requirements detailed in CRN CS 250.

Survey checks shall be carried out to ensure the work is laid to the designed geometry and complies with the requirements of CRN CS 210.

Before any length of track is accepted for traffic use, all fastenings shall be checked and tightened or re-tensioned where necessary.

Any remedial work required to obtain the specified standards shall be carried out by the Contractor.