



V2-S2&S3&S4-7
ATTACHMENT-7 PLANT ROADS



SCOPE

This specification covers the general requirements for the materials and construction of Earthwork, Embankment, Rubble soling of roads.

For RCC Road construction shall be as per IRC standards based on the CBR value. However the minimum requirement for the roads shall be provided with 200mm thick RCC (With nonmetallic hardener) slab executed with vacuum dewatering process with bottom reinforcement 10dia@150c/c on 75 mm thick PCC over 230mm thick rubble soling with below 600mm compacted CNS filling well compacted approved borrowed earth suitable for filling to be done. (Proctor density > 95%).

All Roads with 1000 mm shoulder (filling earth) on either side of road. Road width means carriage width.

1. APPLICABLE CODES AND SPECIFICATIONS

- 1.1.** The following specifications, standards and codes are made a part of this specification. All standards, specifications, codes of practices referred to herein will be the latest edition including all applicable official amendments and revisions. In case where the requirements of this specification conflict with the requirements of those referred to herein, this specification will govern.

IS:460 (Parts 1 to 3)	: Specification for Test Sieves
IS:1124	: Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones.
IS: 1834	: Specification for Hot Applied Sealing Compounds for Joints in Concrete.
IS: 2386 (Parts 1 to 8)	: Methods of tests for aggregates for concrete.
IS:2720 (Part 5)	: Methods of Test for Soils: Part 5 Determination of Liquid and Plastic Limit
IS: 6241	: Method of test for determination of stripping value of road aggregates
IRC: 16	: Specification for priming of base course with bituminous primers



Ministry of : Specifications for road and bridge works
Surface
Transport
(Roads Wing)

All earthworks will be according to component specifications "Earthwork in grading, excavation & backfilling"

2. MATERIALS

General

All materials will be obtained from local sources and will be subject to Engineer's approval prior to use.

3. EARTHWORK

Earthwork in excavation below ground level for box cutting of road to proper slope and camber for making base of Road in all type of soil as the case may be and including site cleaning, the disposal of debris/excavated stuff at designated location, stacking of useful materials as required, levelling and dressing, watering, rolling of earthwork in layers with power roller, filling in depression which occur during the process and compacting the surface, including disposal of soil/debris .

Clearing the Site :

The site on which the Road is to be constructed shall be cleared, and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed. The land width required for the roadway shall be cleared of all trees, vegetation bushes, stumps and all other objectionable materials. The roots of trees and stumps shall be removed to a depth of 30cm. below the grade formation and slopes. Useful materials shall be arranged in convenient stacks along the roads boundary or as directed at places within 50 meters lead. Unsuitable materials disposed off by the contractor at his own cost as per the location shown within lead of 01 KM. Contractor shall carry out site cleaning/ preparation by using grader at their own cost.

After cleaning the site, contractor shall carry out survey work for finalization requirement of excavation/ filling work by taking initial level records and also the alignment of the road shall be properly set out true to line, curves, slopes, grade and sections as directed by the Engineer. The Contractor shall finalized the profile/alignment by arranging dumpy level machine and also should provide all labour and materials such as lime, strings, pegs, nails, bamboos, stones, mortar, concrete etc. required for setting out establishing bench marks and giving profiles. The Contractor shall be responsible for maintaining the B.M. profiles, alignments and other marks as long as they are required for the work in the opinion of the Engineer. Before starting excavation, Contractor shall take levels

and section of the ground and recorded in the presence of the GIPCL engineer so as to serve as the basis of measurement.

Excavation :

Earthwork in excavation in all kinds of soil including soft rock for road in required shape and size for pipe culver, box cutting for road, area grading, etc including excavation below existing ground level at any depth for road of correct size, shape and correct side slope and gradient and in proper line, level and gradient at the site as directed by Engineer in charge. The site shall be left clean of all debris on completion. The excavation shall be carried out in correct line, level & profile of the Road. After completion of excavation up to required level, contractor have to compact excavated surface using water sprinkling and vibro roller before starting sub-base road. Rate for excavation is included all such operations.

The excavation shall be finished neatly, smoothly and evenly to the correct lines, curves, grades, section and side slopes as shown on the plans or directed by the Engineer. If it is necessary in the execution of the work to interrupt existing surface drainage or under drainage, temporary arrangements shall be provided till such time as is necessary. The Contractor at his own cost shall make good the interrupted drainage. Road shall be excavated to the specified section and shall be measured in cubic meters. Signalers shall be stationed at each end to regulate traffic where it is heavy, If necessary. No handling or conveyance charges shall be paid if the materials are temporarily deposited elsewhere and subsequently conveyed to site of deposition.

All above specified preparatory works, site cleaning, grading, survey works etc, shall be in the scope of contractor without any additional cost to GIPCL and quote the rate of excavation accordingly.

Disposal of Excavated Materials:

The excavated earth shall be disposal of surplus excavated soil including loading, un loading transporting, dozing, leveling complete. No materials excavated from the road or drain edge, of whatever kind they may be, are to be placed even temporarily up to 1.5 Mts. or at the distance prescribed by the Engineer, from the outer edge of excavation.

Providing & laying CNS of approved quality including spreading & filling in two layers not more than 300mm thick of each layer, watering, consolidation with vibratory roller for total compacted Avg 600 mm thickness to required level of road including transportation, loading, unloading, dressing in a required line, level and gradient etc. complete as per detailed given in technical specification and as directed by Engineer in charge

The CNS shall be approved quality as approved by the GIPCL Engineer in charge.

1. The CNS shall be cohesive non-swelling materials. & meet the requirement in below table..
2. The permission for spreading the CNS shall be given by the Engineer In charge after the initial levels are recorded in the Field book.
3. The surface shall than be levelled by means of templates and strings as well as with camber boards and spirit level.

4. At the time of spreading CNS, a small quantity (about 4 to 5 percent) of metal as directed shall be retained at the first instance. It shall be spread later on after partial consolidation as required to rectify the camber and fill up the hollows if any..
5. Immediately following the spreading of the CNS rolling shall be started with vibratory roller. The capacity of the vibrating roller shall depend upon the type of the aggregate and shall be indicated by Engineer in Charge
6. Except on super elevated portions where the rolling shall proceed from inner edge to outer, rolling shall begin from the edges gradually progressing towards the centre. First the edge/edges shall be compacted with roller running forward and backward. The roller shall then move inward parallel to centre line of the road in successive passes uniformly lapping proceeding tracks by at least one half the width.
7. During rolling slight sprinkling of water may be done, if necessary. Rolling shall be done when the subgrade is soft or yielding or when it causes like wave like motion in the sub grade or sub base course.
8. The rolled surface shall be checked transversely and longitudinally with templates and rolling until the entire surface conforms to desired camber and grade. In no case shall the use of screening be permitted to make up depression.
9. After each application, the surface shall be continuously sprinkled with water, the resulting surface swept with hand broom or mechanical broom to fill the voids properly and rolled during which water shall be applied to the wheel of the roller if necessary to wash down the binding materials sticking to them. These operations shall continue until the resulting slurry after filling of voids, forms a wave ahead of the moving roller.
10. After final compaction the road shall be allowed to dry overnight. Next morning spots shall be filled with screenings of binding materials as directed, lightly sprinkled with water if necessary and rolled. No traffic shall be allowed on the road until the surface has set.

CNS (Cohesive non-swelling) material shall conform to the requirements given below: -

Sr. No.	Property	Specification Range
1	Grain size analysis i) Clay ii) Silt iii) Sand iv) Gravel	15-25% 35-50% 30-40% Less than 10%.
2	Consistency limits	



	i) Liquid limit ii) Plastic limit iii) Plasticity limit iv) Shrinkage limit	30-50% 20-25% 10-25% 15% and above.
3	a) Swelling pressure when compacted to maximum dry density corresponding to standard proctor compaction with zero initial compaction moisture content for no volume change condition.	Less than 0.1 kg/cm ² (5 kN/m ²)
	b) Swelling pressure when compacted to maximum dry density corresponding to standard proctor compaction and initial compaction corresponding to optimum moisture content for no volume change condition.	Less than 0.05 kg/cm ² (5 kN/m ²)

4. PREPARATION OF SUBGRADE

- 4.1. In general earthwork in subgrade will conform to technical specifications for earth work.
- 4.2. Immediately prior to the laying of the soling the subgrade will be cleaned of all foreign substances, vegetation etc. Any ruts or soft yielding patches that appear will be corrected and the subgrade dressed off parallel to the finished profile. The camber of subgrade will conform in shape to that of the finished road surface. Camber boards will be used to get the required section.
- 4.3. The prepared subgrade will be lightly sprinkled with water, if necessary, and rolled with power roller of not less than 10 tonnes, till the soil is evenly consolidated to 85% of Proctor density with 2% variation in optimum moisture content. Roller will pass minimum 5 runs on the subgrade. Rolling will commence at the edges and progress towards the centre longitudinally. Each pass of the roller will uniformly overlap not less than one third of the track made in the preceding pass. Any undulations in the surface that develop due to rolling will be made good with approved earth and subgrade rerolled. width of the subgrade will be upto outer edge of shoulder.

5. SOLING

The width of the soling course will be 30cm (15cm on either side) more than that of the wearing coat and made-up soil, unless otherwise specified

in the schedule of quantities or shown in the drawing. The edges of the soling will be marked out by strings and stakes. Soling stone will be hand packed and set on edge with greatest length across the road. This will be laid closely in position on the sub-grade, firmly set with their broadest side downwards. The joints will be staggered. All interstices between the stones will be wedged in with locking smaller stones well driven into gaps to ensure tight packing and complete filling of interstices. Such filling will be carried out simultaneously with the placing in position of soling stones and will not lag behind.

After Packing, surface will be checked with template of approved shape and high and low spots corrected by removing soling and re-packing. The top surface of the soling coat will be perfectly true to camber and grade. The soling will then be thoroughly consolidated with power roller of 8-10 tonne weight depending upon the type of soling stones, starting at "edges" and working towards the centre. In case of super elevated curve, the rolling will commence from the inside edge of the curve to the outside edge. The roller will run over the same surface of soling at least 10 times or more till the soling coat is well consolidated to the satisfaction of the Engineer. The surface will be checked by templates and any disturbance in grade or camber corrected after every rolling and finally consolidated. After that, at least 50mm thick moorum will be laid on top of soling coat and rolled with water to proper compaction so that the top surface seems smooth. The rate for soling coat will be inclusive of the cost of the moorum as blinding materials for which no separate payment will be made.

6. For RCC WORK Refer attachment 4 (concrete & Allied work)