



BUILDING RESEARCH NOTE

B.R.N. 93

QUALITY ASSURANCE PLAN (ROAD WORK)

A periodic check is to be carried out by site supervisor/ engineer to ensure quality in the construction. The checks are to be carried out essentially by filling the proforma (enclosed) for each item at the following stages:

- (1) Start of every new item of work
- (2) Once every week (or earlier if the execution of the item is at a faster speed) for each relevant item. The engineer in-charge may also decide to carry out the check at shorter interval.
- (3) Apart from above, the supervisors /engineers are advised to follow the check lists during their daily or routine supervision/ inspection/ site visits to ensure strict adherence for quality control measures.

CHECK LIST

Action/ Measure	Yes/ No	If No then mention reasons	Follow-up Action	Remarks
Road Work				
Bituminous Road:				
➤ Testing of following materials done: (Enclose brief report & the date of testing)				
(i) Coarse Aggregate <ul style="list-style-type: none"> • Aggregate Abrasion Value • Aggregate Impact Value • Flakiness Index • Grading requirement 	Y / N Y / N Y / N Y / N			
(ii) Fine Aggregate <ul style="list-style-type: none"> • Deleterious materials 	Y / N			
(iii) Bitumen manufacturer's certificate w.r.t. following: <ul style="list-style-type: none"> • Specific gravity at 27° C. • Water content. • Flush point. • Softening point. • Penetration at 25°C. • Ductility at 27°C. • Loss of heating. • Residue of specified penetration. • Solubility in carbon-di-sulphide or tri-chloroethylene. 	Y / N Y / N Y / N Y / N Y / N Y / N Y / N Y / N Y / N			

Action/ Measure	Yes/ No	If No then mention reasons	Follow- up Action	Remarks
(iv) Embankment under (OMC conditions) <ul style="list-style-type: none"> Moisture content Density Control test on borrow pits. 	Y / N Y / N Y / N			
➤ Layout of road is correlated with architectural drawing.	Y / N			
➤ Proper level is maintained by cutting or filling the earth work.	Y / N			
➤ The sub-grade/ embankment have been consolidated with a power road roller of 8 to 12 tonnes. (The roller should pass at least 5 runs on the sub-grade.)	Y / N			
➤ The finished surface of sub-grade/ embankment after consolidation is uniform and conformed to the line, grade and typical cross-section as per drawing within the following tolerances:				
(i) Longitudinal Profile maximum permissible undulation when measured with 3m straight edge - 24 mm.	Y / N			
(ii) Cross Profile maximum permissible variation from specified profile when measured with a camber template - 15 mm.	Y / N			
➤ Stone aggregate is stacked in convenient units of 1 m top width, 2.20 m bottom width, 60 cm height and of length in multiple of 3 m.	Y / N			
➤ The stack is uniformly distributed along the road and has been numbered serially.	Y / N			
➤ Sub-base is prepared with the stone of specified size, grade required thickness layer and consolidated to the desired level by 8 to 12 tonnes roller.	Y / N			
➤ Binding materials laid to prevent ravelling of water bound macadam construction consisting of a fine grained material possessing plastic index value of 4 to 9.	Y / N			
➤ Voids are properly filled with screening & specified binding materials.	Y / N			
➤ Sub-base is prepared in layers of not more than 100 mm compacted thickness.	Y / N			
➤ Rolling is done until the road metal is thoroughly keyed with no creeping of metal ahead of roller.	Y / N			
➤ During rolling the surface is checked for grade and camber.	Y / N			
➤ Base course is provided as per specified stone aggregate of size, grade in the required layer of thickness & consolidated properly.	Y / N			
➤ Inert material or non-plastic mineral matter is used as a filler material.	Y / N			
➤ Voids are filled with screening of sizes 13.2 mm or 11.2 mm as per grading classification.	Y / N			
➤ The surface of base course is cleaned with brushes and all loose or foreign matters have been removed from the entire surface of pavement before application of tack coat.	Y / N			
➤ Bitumen work is not done during rainy weather or when the surface was damp or wet or the atmospheric temperature in the shade is 16 ⁰ C or below.	Y / N			

Action/ Measure	Yes/ No	If No then mention reasons	Follow-up Action	Remarks
➤ Bitumen is heated in a boiler to a temperature of 165 ^o C to 175 ^o C and maintained at that temperature for tack coat.	Y / N			
➤ Bitumen is sprayed with pressure and at a specified rate and the bitumen is applied longitudinally along the length of the pavement and never across it.	Y / N			
➤ Bitumastic sheet with hot bitumen is applied at atmospheric temperature of 16 ^o C or above.	Y / N			
➤ Quantities of materials and bitumen are used as specified.	Y / N			
➤ The temperature of bitumen at the time of laying of bitumastic sheet with hot bitumen is not to exceed 200 ^o C and not less than 170 ^o C.	Y / N			
➤ The following defects (if persists) in hot laid flexible pavements have been corrected:				
<ul style="list-style-type: none"> • Bleeding • Brown Dead Appearance • Rich Fat Spot • Poor Surface Texture • Rough Uneven Surface • Honeycomb or Ravelling • Uneven Joints • Roller Marks • Pushing or Waves • Cracking (Fine/ Large) • Aggregate Broken by Roller • Tearing of Surface on Laying • Surface Slipping on Base 	Y / N Y / N Y / N Y / N Y / N Y / N Y / N Y / N Y / N Y / N Y / N Y / N Y / N			
➤ Tests for Marshal Stability & Flow Value of asphaltic concrete carried out. (Enclose brief report & the date of testing)	Y / N			
➤ Tests for binder content and gradation (after extraction of binder content) carried out. (Enclose brief report & the date of testing)	Y / N			
➤ Tests for thickness and density of compacted layer of asphaltic concrete and bitumen macadam carried out. (Enclose brief report & the date of testing)	Y / N			
Cement Concrete Pavement:				
➤ Testing of following materials done: (Enclose brief report & the date of testing)				
(i) Water <ul style="list-style-type: none"> • Organic/inorganic • Sulphate • Chloride • Suspended matter • PH-value 	Y / N Y / N Y / N Y / N Y / N			
(ii) Cement <ul style="list-style-type: none"> • Manufacturer's Certificate • Fineness • Initial/ Final Setting Time • Compressive Strength 	Y / N Y / N Y / N Y / N			
(iii) Sand <ul style="list-style-type: none"> • Silt contents • Particle size distribution • Deleterious constituents • Moisture Contents • Bulking of sand 	Y / N Y / N Y / N Y / N Y / N			

Action/ Measure	Yes/ No	If No then mention reasons	Follow- up Action	Remarks
(iv) Coarse Aggregate <ul style="list-style-type: none"> Percentage of soft/deleterious materials Ten per cent fine value Particle size distribution 	Y / N Y / N Y / N			
➤ Cement is properly stored in dry shed or stacked above ground level and covered with plastic sheets.	Y / N			
➤ Concrete mix design has been done	Y / N			
➤ Expansion joint filler/material according to specification	Y / N			
➤ Construction joints planned	Y / N			
➤ Concrete of approved mix design being used	Y / N			
➤ Admixtures, if any, is used in right proportion	Y / N			
➤ Quality of admixture is ascertained (should be BIS marked)	Y / N			
➤ Concreting to start from farthest point to nearest point w.r.t. batching plant	Y / N			
➤ Concrete is used within 30 minutes after mixing water.	Y / N			
➤ Cement slurry being applied on construction joints	Y / N			
➤ Technical supervision at batching plant / mixer	Y / N			
➤ Concrete is placed within initial setting time	Y / N			
➤ Proper compaction is done	Y / N			
➤ Concreting is done in a lift not exceeding 1.5 m	Y / N			
➤ Slump tests at regular interval to ensure proper workability	Y / N			
➤ Cubes being cast for testing at the interval of 7 and 28 days	Y / N			
➤ Sufficient number of mixers and vibrators available.	Y / N			
➤ Proper water curing for required number of days, as specified	Y / N			
➤ Concrete interlocking paving blocks have been tested for compressive strength before placing. (Enclose brief report & the date of testing)	Y / N			
➤ Rebound hammer tests after attaining 28 days strength, carried out. (Enclose brief report & the date of testing)	Y / N			

N.B.: Detailed specifications/ methodology of treatment for any item of work shall be reckoned as given in relevant code(s).

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