Cement concrete road construction ppt

Continue

Sié e view direction of traffic sié e view approach slab leave slab sié e view approach slab leave slab

Fig.-2

MATERIAL MIXING AND PLACING OF CONCRETE

Mixer is equipment that mix the concrete using distinct amount of cement, concrete, sand and water. There are two type of mixer generally used during construction,

Batch mixer- used for small road construction Continuous mixer- used for large construction.

Fig.-1

Continuous mixer- used for large construction

> If distance is more from site, mix concrete transported at site within setting time.



Site Preparation

Before construction begins, the construction site must be carefully prepared, This includes preparing the grade or road base, sub grade and sub base-

- First the site is graded to cut high points and fill low areas to the desired roadway profile elevations.
- > Generally, cut material can be used as embankment fill.
- > A course of material is placed on the sub grade to provide drainage and stability.
- A course of fairly rigid material, sometimes cement- or asphalt-treated, that is placed on the sub base to provide a stable platform for the concrete pavement slab.





15. MEASURES TO OBTAIN A GOOD EVENNESS

A good evenness depends primarily on the following factors:-

- A concrete mix with an uniform consistency, adapted to the paving machines and the working circumstances,
- A regular supply of concrete and a uniform spreading in front of the paver,
- Correct operation of the paving machines, which in turn depends on the setting of the forms or the sensor lines, the quality of the track runways, the regulation of the sensors, etc.,
- Steady progress of the paver, without interruptions and with a speed compatible with the consistency of the concrete and the working circumstances,
- use of specific tools or equipment to eliminate small bumps after the paving machines: correction beam, super smoother, etc



TE) TREMIX ENGINEE

Based on the paving styles, <u>cc road construction companies</u> can construct three types of concrete pavements – Jointed plain concrete pavement (JPCP) with transverse joints spaced less than 5 to 6.5 m, Jointed reinforced concrete pavement (JRCP) with joints spaced between 9 to 12 m and Continuously reinforced concrete pavement (CRCP).



1. GOVT ENGG COLLEGE BIKANER SUMMER TRAINING PRESENTATION on CC ROAD CONSTRUCTION held at PUBLIC WORKS DEPARTMENT JHUNJHUNU Submitted by :- AKSHAY KUMAR 13EEBCE002 2. INTRODUCTION • Cement concrete pavements are generally constructed using plain cement concrete slab. • CC pavement serves good & durable wearing surface as well as an effective and strong base course. • The routine and periodic maintenance cost is very low as maintenance of joints only required . • The life cycle cost of CC pavement are much lower then flexible pavements. • CC pavements are generally designed and constructed for 30 years. 3. MATERIALS FOR CONSTRUCTIONS • Portland cement • Coarse aggregate • Fine aggregate • Fine aggregate • Water • Steel bars • Admixtures etc. 4. AGGREGATE • Coarse aggregate sused for construction shall fulfill the following requirements: 1) Los Angeles abrasion value - < 35% 2) Flakiness & Elongated index - < 35% 3) Water absorption - < 3% max size 31.5 mm • Fine aggregates shall be: 1) Well graded. 2) 100% passing 10mm sieve. 5. ABRASION VALUE TEST • Due to the movements of traffic, the road stones used in the surfacing course are subjected to wearing action at the top. Resistance to wear or hardness is hence an essential property for road aggregates, especially when used in wearing course. Thus road stones should be hard enough to resist the abrasion due to the traffic. When fast moving traffic fitted with pneumatic tires move on the road surface causes abrasion on the road stone. 6. LOS ANGELES ABRASION APPARATUS 7. AGGREGATE IMPACT VALUE • This test is done to determine the aggregate impact value of coarse aggregates as per IS: 2386 (Part IV) - 1963. • The apparatus used for determining aggregates is Impact testing machine conforming to IS: 2386 (Part IV) - 1963. Sieves of sizes - 12.5mm, 10mm and 2.36mm, • A cylindrical metal measure of 75mm dia, and 50mm depth, A tamping rod of 10mm circular cross section and 230mm length, rounded at one end and Oven. 8. AGGREGATE IMPACT APPARATUS 9. AGGREGATE IMPACT APPARATUS 9. AGGREGATE CRUSHING VALUE • The principal mechanical properties required in road stones are satisfactory resistance to crushing under the roller during construction and adequate resistance to surface abrasion under traffic surface stresses under rigid type rims of heavily loaded animal drawn vehicles ate high enough to consider the crushing strength of road aggregates or on cylindrical specimen cut out of rocks . 10. CEMENT • The name ordinary Portland cement (OPC) is reserved for a cement which is: an extremely finely ground product obtained by burning together at high temperature specifically proportioned amounts of calcareous and argillaceous raw materials, adding nothing else to the burnt product except gypsum in small percentage. • Cement which is used in road construction passes under these experiments: a) Fineness of cement. b) Soundness of cement. c) Setting time of cement. 11. SOUNDNESS OF CEMENT • All cements expand to some extent on setting. • This expansion is sometimes responsible for cracking of cement is, therefore, understood its capacity to form a non- disintegrating, hard and uniformly strong mass on setting. • This depends on its original composition, proper burning and grinding. • Presence of lime in free state, an excess of sulphate or magnesia and a very fine size may be the cause of unsoundness in a cement. 12. Le-chtelier's apparatus 13. SETTING TIME OF CEMENT • By Setting of cement is understood conversion of a plastic paste of cement and water to a non-plastic and rigid mass. • This change from a plastic mass to a non-plastic and rigid mass may take comparatively longer time. • Moreover, setting is not abrupt process which complete immediately and an end. It is on this latter basis, setting is distinguished into initial and final setting, qualified by the time required in each case. 14. VICAT APPARATUS 15. COMPONENTS OF CC PAVEMENT • Sub base coarse dry lean concrete (Cc slab) and old concrete (DLC). • Pavement slab to withstand over flexural stress. 16. PREPARATION OF CONCRETE Recommended water content and workability • W-C ratio shall be in range 25 ± 10 mm. • Generally M40 concrete is used in cc road for which approximate w-c ratio is 0.38. 17. MIXING • Mixing of concrete is done by two methods. These are as following. a. Hand mixing b. Machine mixing 18. TRANSPORTING AND PLACING 19. FORMWORK 20. CONSTRUCTION STEPS • Construction of sub-grade. • Construction of drainage layer. • Construction of sub-base course. • Laying of separation membrane. • Construction of CC pavement slab. 21. CONSTRUCTION OF CC SLAB Operations involved in it 1. Spreading the prepared concrete mix to desire thickness 2. COMPACTING Internal vibrator Surface vibrator 23. CURING • Curing is the term used for the job of keeping the fresh concrete wet till desired purpose of ensuring complete setting and hardening of cement in the concrete is achieved. • Curing of concrete is contain many steps: a) Objects of curing. b) Methods of curing. c) Time required for curing. 24. PONDING CURING 25. JOINTS • Contraction joints • Construction joints • Cons • Usually, a concrete pavement is only opened to traffic 7 days after the concrete has been laid and after, in the presence of all parties, any possible cracks have been recorded. • A concrete pavement of less than 7 days old, can be opened to traffic if the contractor provides proof that the concrete has reached the minimum compressive strength stipulated in the specifications. • Special compositions of the concrete mix allow an early opening to traffic. 27. THANK YOU 1 CONCRETE AND ASPHALT PAVEMENT 3 DIFFERENCES BETWEEN CONCRETE BETWEEN CONCRETE BAND ASPHALT PAVEMENT 3 DIFFERENCES BAND ASPHALT P pavement is rigid pavement In both pavement In both pavement load is distributed over subgrade Major factor in rigid pavement is structural strength of concrete In concrete In concrete pavement is more susceptible to water 4 CONCRETE PAVEMENT FUNDAMENTALSConcrete pavement is becoming more versatile pavement. They may be designed for a life of 5,10,20,50 years. Each concrete pavement consist of important components: Transverse joint Tie bar Dowel bar Sub base Sub grade Longitudinal joint 5 JOINTED PLAIN CONCRETE PAVEMENTJointed Plain Concrete Pavement contain enough joints to control natural cracks JPCP do not contain any steel reinforcement Smooth steel bars at transverse joints and deformed steel bars at transverse joints and deformed steel bars at longitudinal joints Today majority of the U.S state agencies build jointed plain pavement 6 CONCRETE PAVEMENT TYPESConcrete pavement is divided in to 3 types Jointed plain Jointed reinforced Continuously reinforced Each type used to control crack development Crack development due to concrete shrinks, contracts and expands Cracking can be controlled by use of joints and reinforcing steel 7 JOINTED PLAIN CONCRETE PAVEMENT 8 JOINTED P mesh reinforcement In JRCP designers increase the joint spacing purposely and include reinforcing steel The spacing between transverse joints is typically 30 feet or more Today only a handful of agencies employ this design 9 JOINTED REINFORCED CONCRETE PAVEMENT 10 CONTINUOUSLY REINFORCED CONCRETE PAVEMENT Continuously Reinforced Concrete Pavement does not require any transverse contraction joints Transverse cracks are expected in the slab at intervals of ft In CRCP steel designed with % by cross sectional area, so the cracks are together tightly 11 CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 12 JOINTS There are three basic joint typesContraction Construction Isolation Important factor is load transfer to sub-base 13 CONTRACTION IOINTS This joints are contraction, moisture Transverse contraction joints are cut at a right angle to the payement centreline and edges 14 CONTRACTION IOINTS 15 CONSTRUCTION IOINTS Construction joints join concrete is paved at different times Transverse construction joints are necessary at the end of a paving segment, cross road or bridge 16 CONSTRUCTION JOINTS 17 ISOLATION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints are necessary at the end of a paving segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 16 CONSTRUCTION JOINTS 18 Isolation joints segment, cross road or bridge 18 movement of the pavement 18 ISOLATION JOINTS 19 CONCRETE PAVING BASICSThere are two basic methods Fixed-form paving Slip-form Cont...There are a variety of different fixed form paving machines The least complex are vibratory screeds and revolving tubes These hand-operated machines finish the surface of the pavement between fixed forms 21 ROLLER SCREED (REVOLVING TUBE) FOR FIXED-FORM PAVING ON A STREET 22 SLIP-FORM Slip-form paving is preferred by contractors for large paving areas It can provide better productivity with less labor Some machines are also equipped with automatic finishing equipment and equipment to automatically insert dowel bars into the pavement at transverse joints 23 SINGLE-TRACK SLIP-FORM PAVER 24 SLIP-FORM Cont... While paving, slip-form paving machines are equipped with sensors to follow string-lines that are put into position along either side of the paving area The string-lines control the paver direction and surface elevation Smaller paving projects may use only the slip-form machine 25 SINGLE-TRACK SLIP-FORM PAVER 26 FAST-TRACK CONCRETE BASICSFast- track concrete mixtures develop strength rapidly They are beneficial when early opening of the pavement is necessary Most often the concrete mixture components are specially proportioned and selected for rapid early strength

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