BHARATMALA
ROAD TO PROSPERITY

भारतीय राजमार्ग अभियन्ता अकादमी
(सड़क परिवहन एवं राजमार्ग मंत्रालय, भारत सरकार)
Indian Academy of Highway Engineers
(Ministry of Road Transport and Highways, Govt. of India)

Construction, Quality Control & Maintenance of Flexible & Rigid Pavement

Day-1	
09:30-09:45	Registration & Introduction
09:45-13:00	**Machinery and Equipment for Flexible Pavement Construction** ❖ Machinery for Earthwork & GSB such as Excavator, Dozer, Grader, Water Sprinkler etc. ❖ Machinery for WMM such as WMM Plant with all accessories, Paver Finisher etc. ❖ Equipment for Tack Coat and Prime Coat (Bitumen Pressure Distributor ❖ Hot Mix Plant (Drum Mix Plants and Batch Type Mixing Plants) ❖ Calibration of mixing plants ❖ Machinery for transportation of Soil, GSB, WMM and Hot Mix ❖ Paver Finisher for laying of Hot Mixes ❖ Equipment for compaction such as three wheel static rollers ,vibratory rollers, pneumatic rollers etc ❖ Sequencing of Rollers in compaction of flexible pavements layers
14:00-17:00	**Construction of Earthwork & Granular Courses & Quality Control** ❖ Material Characteristics for Earthwork including Sub-Grade ❖ Borrow Area Identification ❖ Fixing Reference Pillars ❖ Clearing & Grubbing ❖ Laying & Compaction of Earthwork including Sub-Grade ❖ Quality Control & Acceptance of Earthwork including Sub-Grade ❖ Material Characteristics for GSB, Stabilised Layers, WBM, WMM, Crusher Run Macadam ❖ Construction of GSB, Stabilized layers, WBM, WMM, Crusher Run Macadam including control of alignment, levels and surface regularity of different layers, rectification of surface irregularity, compaction standards etc. ❖ Quality Control & Acceptance of GSB, Stabilized layers, WBM, WMM, Crusher Run Macadam
Day-2	
09:45-13:00	**Binders for Bituminous Construction & Quality Control** ❖ Viscosity Grade Bitumen and its Specification and properties ❖ Significance of bitumen properties in construction and performance ❖ Selection Criteria for bituminous binders ❖ Bitumen Emulsions and their Specifications ❖ Merits of bitumen Emulsions ❖ Cutback Bitumen and their specifications for road works ❖ Modified Bitumen, their specifications and selection criteria ❖ Additives such as warm mix additives, antistripping agents, rejuvenating agents ❖ Quality control tests and acceptance criteria of binders ❖ Sampling of binders

A-5, Institutional Area, Sector-62, Noida (UP) – 201 301 (India)
Tel 0120-2405006,
Email: iahe.training@gmail.com Website: iahe.org.in

14:00-17:15	**Bituminous Mix Design** ❖ Need of mix design ❖ Principles of bituminous mix design ❖ Marshall Method of mix design ❖ Design Criteria ❖ Aggregate properties ❖ Design Procedure for Design of DBM, BC and SMA ❖ Proportioning of Materials ❖ Density and Voids analysis ❖ Significance of various mix properties ❖ Significance of filler- bitumen Ratio ❖ Overview of SUPERPAVE mix design procedure **Mix Design in Laboratory** ❖ Marshall Apparatus ❖ Preparation of Marshall Specimen: Proportioning of aggregates, preparation of specimens ❖ Stability , Flow Testing , Density –Voids analysis and Job Mix Formula
Day-3	
09:45-13:00	**Construction of Bituminous Courses & Quality Control** ❖ Construction of different types of bituminous layers such as BM, DBM, BC, SMA and Mastic Asphalt ❖ Production and Transportation of Mix ❖ Test Strip for Construction ❖ Paving of Mix ❖ Compaction of bituminous surface ❖ Control of segregation ❖ Construction Joints ❖ Control of surface regularity ❖ Quality Control & Acceptance of bituminous layers such as BM, DBM, BC, SMA and Mastic Asphalt
14:00-17:15	**Evaluation of Flexible Pavement :** ❖ Functional Evaluation of Flexible Pavement ❖ Structural Evaluation of Flexible Pavement by Falling Weight Deflectometer Pavement Condition Rating ❖ Homogeneous Sections ❖ Overlay Design, Strengthening and Rehabilitation of Flexible Pavement
Day-4	
09:45-13:00	**Machinery and Equipments for Construction of Rigid Pavements**:- ➢ Stone Crusher (Jaw Crusher, Cone Crusher, VSI, Screening Units etc.) ➢ Concrete Batching Plant including Storage Silo for Cement, Fly Ash and Chilling Plant ➢ Slip Form Paver including Complete Assembly ➢ Joint Sawing Machine

14:00-17:15	**Construction of Rigid Pavement & Quality Control** ➢ Material for Transverse Contractions, Expansions and Longitudinal Joints (Dowel Bar, Tie Bar, Sheathing, Expansion Cap, Sealant) ➢ Production of Concrete for DLC, Transportation, laying, Compaction, Finishing, Curing of DLC ➢ Production of Concrete for PQC ➢ Transportation of Concrete for PQC ➢ Separation Membrane ➢ Slip Form Paving of PQC including Placing of Concrete, Laying by Slip form Paver ➢ Insertion of Dowel and Tie Bar ➢ Compaction, Floating and Finishing of Concrete ➢ Tining ➢ Curing ➢ Initial Saw Cutting of Joint ➢ Widening of Joints and Sealing Weather and Temperature limitation
Day-5	
09:45-13:00	**Maintenance & Repair of Flexible Pavement** ❖ Types of distress in Flexible Pavement such as bleeding, smooth surface, streaking, hungry surface, cracking, rutting, corrugation, shoving, slippage depressions, settlements, upheavals, stripping, raveling, potholes and edge breaking etc ❖ Causes of different types of pavement distress, identification methods and repair treatment thereof ❖ Preventive maintenance, need and types ❖ Recycling of Pavement ❖ Micro-surfacing ❖ Stress absorbing membrane and stress absorbing membrane interlayer for crack sealing and prevention of reflection cracking
14:00-17:15	**Evaluation and Repair/Rehabilitation of Rigid Pavements** ➢ Distresses in Rigid Pavements • Structural & Functional evaluation Distresses • Cracking (Plastic Shrinkage, Transverse, Longitudinal, Diagonal, Corner, Alligator, Crazing etc.) • Surface Distresses (Ravelling/Scaling, Pop-outs / Small holes, Loss of Surface Texture, Polished Surface/ Glazing / Smooth surface etc.) • Joint Defects (Separation at joints, Joint Seal defects, Spalling at joints, Faulting (or stepping) at joints) • Deformation Defects (Depression, Heave, Bump, Blowups or Buckling, Drop off, Erosion/Undermining, Inadequate Drainage Defect, Pumping etc.) ➢ Pavement Evaluation • Identification of Distresses

	• Measurement of Extent and Severity of Distress • Rating of Distresses in Pavement ➢ Restoration/Repair Techniques • Preventive Techniques • Corrective Techniques • Preventive and Corrective Techniques ➢ Repair & Rehabilitation of Rigid Pavement • Crack Sealing • Repair of Joint Sealant • Crack Stitching • Stapling • Slot Stitching • Partial Depth Repair • Repair of Popouts/Potholes/Spalling • Full Depth Repair • Slab Stabilization • Retrofitting of Dowel Bars • Slab Lifting or Jacking • Diamond Grinding • Diamond Grooving	
17:30	Concluding and distribution of Certificates	
	11:30- 11:45 Tea 13:00- 14:00 Lunch 15:30- 15:45 Tea	