



**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)

**Certificate Course for Quality Control/Assistant Quality Control Engineers (sub-professionals) of Contractors/Consultants on Materials Testing Processes at IAHE, Noida**

1 <sup>st</sup> Day	
09:45-13:30	Role of Concessionaire/Contractor, Independent Engineer/ Authority Engineer and Authority in Quality Assurances and Quality Control of PPP and EPC Projects
14:30-17:45	Principles of Quality Assurance and Quality Control in Highway Projects <ul style="list-style-type: none"><li>➤ Quality Assurance</li><li>➤ Quality Control, testing methods and significance of various tests</li><li>➤ Personnel</li><li>➤ Protocol for Factory Manufactured Materials &amp; Finished Products</li><li>➤ Site Laboratory &amp; Testing</li><li>➤ Calibration of Testing Equipment</li><li>➤ Statistical Check</li><li>➤ Acceptance Process</li></ul>
2 <sup>nd</sup> Day	
9:45-13:00 & 14:00-17:15	QA and QC in Earthwork, Sub-grade, Granular Sub-Base/Base Courses including Stabilized Sub-Grade/Sub-Base Courses and Sub-surface Drainage Measures <ul style="list-style-type: none"><li>➤ Materials including Fly ash, Slag, Lime, Cement, C&amp;D waste, Geo-Textiles</li><li>➤ Quality Characteristics of Materials and significance</li><li>➤ Specification Limits of Quality Characteristics of Materials &amp; Applicable Code of Practice</li><li>➤ Quality Characteristics of Finished Layers and significance</li><li>➤ Specification Limits of Quality Characteristics of Finished Layers &amp; Applicable Code of Practice</li></ul>
3 <sup>rd</sup> Day	
9:45-13:00 & 14:00-17:15	Significance of various tests on Soils, testing procedures and laboratory Quality Control Tests on Soils <ul style="list-style-type: none"><li>➤ Sieve Analysis</li><li>➤ Wet Analysis</li><li>➤ Modified Proctor Test</li><li>➤ Liquid Limit, Plastic Limit &amp; Swelling index</li><li>➤ Field Density</li><li>➤ CBR</li><li>➤ DCP</li><li>➤ Unconfined Compressive Strength (UCS)</li><li>➤ Tri-axial Test</li><li>➤ Direct Shear Test</li><li>➤ Permeability Test</li></ul>

कृपया ध्यान दें: सभी पत्राचार केवल निदेशक को पदनाम द्वारा संबोधित किए जाएं।/Please note: All correspondence should be addressed to the Director by designation

ए-5, इंस्टीट्यूशनल एरिया, सेक्टर-62, नोएडा (यूपी) - 201309 (भारत) / A-5, Institutional Area, Sector-62, Noida (UP) - 201309 (India)

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4 <sup>th</sup> Day	
9:45-13:00 & 14:00-17:15	Laboratory Quality Control Tests on Soil (Continues)
5 <sup>th</sup> Day	
9:45-13:00 & 14:00-17:15	Laboratory Quality Control Tests on Soil (Continues)
6 <sup>th</sup> Day	
9:45-13:00 & 14:00-17:15	<p>Significance of various tests on Aggregates, testing procedures and laboratory Quality Control Tests on Aggregates</p> <ul style="list-style-type: none"> <li>➤ Sieve Analysis</li> <li>➤ Los Angeles Abrasion Value</li> <li>➤ AIV</li> <li>➤ Flakiness and Elongation Index</li> <li>➤ Water Absorption</li> <li>➤ Soundness</li> <li>➤ Specific Gravity</li> <li>➤ Stripping Test</li> </ul>
Holiday	
7 <sup>th</sup> Day	
9:45-13:00	<p>QA and QC in Bituminous Base &amp; Wearing Courses</p> <ul style="list-style-type: none"> <li>➤ Materials used in Bituminous Base &amp; Wearing Courses including Tack Coat, Prime Coat, Crack Sealing Treatment, SAM, SAMI, RAP etc.</li> <li>➤ Quality Characteristics of Materials &amp; significance of tests</li> <li>➤ Specification Limits of Quality Characteristics of Materials including Testing Method &amp; Applicable Code of Practice</li> <li>➤ Quality Characteristics of Finished Layers</li> <li>➤ Specification Limits of Quality Characteristics of Finished Layers including Testing Method &amp; Applicable Code of Practice</li> </ul>
14:00-17:15	<p>Laboratory Quality Control Tests on Bitumen, Emulsion and Modified Bitumen</p> <ul style="list-style-type: none"> <li>➤ Penetration</li> <li>➤ Ductility</li> <li>➤ Viscosity</li> <li>➤ Softening Point</li> <li>➤ Flash &amp; Fire point</li> <li>➤ Elastic Recovery of Modified Bitumen</li> <li>➤ Separation Test of Modified Bitumen</li> <li>➤ Residue by Evaporation of Emulsion</li> </ul>

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	<ul style="list-style-type: none"> <li>➤ Viscosity of Emulsion</li> <li>➤ Sieve Test of Emulsion</li> <li>➤ Storage &amp; Stability Test of Emulsion</li> <li>➤ Bitumen Extraction Test</li> </ul>
<b>8<sup>th</sup> Day</b>	
9:45-13:00 & 14:00-17:15	Laboratory Quality Control Tests on Bitumen, Emulsion and Modified Bitumen (Continue)
<b>9<sup>th</sup> Day</b>	
9:45-13:00	Bituminous Mix Design Method & Laboratory Preparation of Test Specimen <ul style="list-style-type: none"> <li>➤ Quality Characteristics of Bituminous Mixes such as DBM &amp; BC</li> <li>➤ Specification Limits of Quality Characteristics of Bituminous Mixes including Testing Method &amp; Applicable Code of Practice</li> <li>➤ Marshall Method of Bituminous Mix Design</li> <li>➤ Laboratory Preparation of Test Specimen</li> </ul>
14:00-17:15	Laboratory Tests and Determination of Optimum Binder Content <ul style="list-style-type: none"> <li>➤ Stability, Flow</li> <li>➤ Voids in Mineral Aggregate (VMA)</li> <li>➤ Voids filled with bitumen (VFB)</li> <li>➤ Density</li> <li>➤ Specific Gravity</li> <li>➤ Optimum Binder Content</li> </ul>
<b>10<sup>th</sup> Day</b>	
9:45-17:15	Bituminous Mix Design, Preparation of Test Specimen, Laboratory Tests and Determination of Optimum Binder Content (continue)
<b>11<sup>th</sup> Day</b>	
9:45-13:00 & 14:00-17:15	QA and QC in DLC & PQC <ul style="list-style-type: none"> <li>➤ Materials used in DLC &amp; PQC</li> <li>➤ Quality Characteristics of Materials &amp; significance of various tests</li> <li>➤ Specification Limits of Quality Characteristics of Materials including Testing Method &amp; Applicable Code of Practice</li> <li>➤ Quality Characteristics of Finished Layers</li> <li>➤ Specification Limits of Quality Characteristics of Finished Layers including Testing Method &amp; Applicable Code of Practice</li> </ul>
<b>12<sup>th</sup> Day</b>	
08:00-20:00	Site Visit of Quality Control Works on Flexible Pavement including Bitumen Extraction and Core Density of Compacted layers, calibration of HMP and Quality Control Works on Rigid Pavement including Coring & Testing from PQC, Calibration of Concrete Batching Plant, Field laboratory, etc. on Delhi-Aligarh Highway

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**Holiday**

**13<sup>th</sup> Day**

9:45-13:00 & 14:00-17:15	Laboratory Quality Control Tests on Cement <ul style="list-style-type: none"><li>➤ Consistency</li><li>➤ Fineness</li><li>➤ Initial and Final Setting Time</li><li>➤ Compressive Strength &amp; Flexural Strength</li><li>➤ Soundness Test</li><li>➤ Specific Gravity</li></ul>
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**14<sup>th</sup> Day**

9:45-13:00 & 14:00-17:15	Concrete Mix Design Method & Laboratory Preparation of Test Specimen <ul style="list-style-type: none"><li>➤ Quality Characteristics of Concrete Mixes (Structural Concrete and Pavement Quality Concrete)</li><li>➤ Concrete Mix Design procedure (Structural Concrete and Pavement Quality Concrete)</li><li>➤ Laboratory Preparation of Test Specimen</li><li>➤ Workability Test (Slump, Flow Table &amp; Compaction Factor)</li><li>➤ Laboratory Test of Concrete Cubes &amp; Beams</li></ul>
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**15<sup>th</sup> Day**

9:45-13:00	QA & QC in RCC & PSC & Steel Structures <ul style="list-style-type: none"><li>➤ Quality Characteristics of Materials such as Reinforcing Steel, Prestressing Strand, Anchorage, Duct, Super plasticizer, Structural Steel etc.</li><li>➤ Specification Limits of Quality Characteristics of Materials including Testing Method &amp; Applicable Code of Practice</li></ul>
14:00-17:15	Non-Destructive Testing of Concrete Structures including Hands on Experience on Rebound Hammer, Ultrasonic Pulse Velocity etc.

**16<sup>th</sup> Day**

09:00-10:00	Written Test
10:00-11:30	QA & QC of Finished Products such Bearings, Expansion Joints, Road Signs, Pavement Marking etc.
11:30-15:15	Viva Voce on Practical tests
15:30- 17:00	Discussions, Declaration of Result, Feedback, Distribution of certificates and concluding

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