Slope Management in Hill Roads & Landslide Mitigation

Time Period	Description of Topic
1st Day	
09:45 – 11:15	**Hill Slope across Highways** ➢ Definition of Highway Slopes ➢ Components of Hill Slope across Highways ➢ Geological, Geomorphological, Geohydrological, Geotechnical, Ecological/Environmental Interactions and Interrelationships between Slope Components ➢ Virgin Slopes ➢ Highway Cut Slopes ➢ Manmade Slopes
11:30-13:00 & 14:00-15:30	**Highway Slope vs. Mass Wasting & Instability** ➢ Classification of Slope Processes vis-à-vis Slope Types ➢ Conditions, Causes and Factors influencing Mass Movement and Instability on Slope and their Mechanism
15:45-17:15	**Investigations of Hill Slopes & Processes** ➢ Geological Investigations**-** Identification of material, properties and classification ➢ Geomorphological Investigations- Micro and macro features of morphology ➢ Geohydrological Investigations- Surface and Sub-surface Drainage Investigations, Watershed Management ➢ Geotechnical Investigations
2nd Day	
09:45 – 11:15	**Investigations of Hill Slopes & Processes contd..**
11:30-13:00	**Highway Hill Slope Data Base and Inventory** ➢ Purpose of database ➢ Inventory methods for preparation of a data base
14:00-15:30	**Highway Hill Slope Vulnerability and Risk Assessment** ➢ Highway hill slope rating system • Rating criteria for identification and classification of highway slopes • Suitability/vulnerability and potential for hill slope failure ➢ Zonation of slopes • Zonation of highway hill slopes based on their vulnerability classes (methods and applications) • Identification/estimation/calculation of risk due to vulnerable highway hill slopes
15:45-17:15	**Highway Slope Monitoring and Forecasting System** ➢ Significance of monitoring and forecasting ➢ Methods and application of monitoring including instrumentation and forecasting ➢ Case Study

3rd Day	
09:45 – 13:00 & 14:00-17:15	**Highway Hill Slope Protection Structures (Construction & Maintenance)** ➢ Stabilization of slopes- Excavation at Top of Slope, General Flattening of Slope, Benching of Slope, Complete Removal of Unstable Mass, Earth Fill at Toe Slope, Rock or Gravel Fill at Toe of Slope ➢ Selection of Structures for Protection-Debris Arrestors, Retaining Wall, Breast Wall, Toe Wall, Piles, benching, Filter beds,Easing of Slopes, Bitumen/ Asphalt mulching, Chutes and Sloping Aprons, Turfing ➢ Retaining Structures- Rock and Earth Fill Buttress at Toe of Slope, Cribs or Gravity Retaining Wall, Pile Walls, Caisson Toe of Slope, Barriers at Toe anchored by Tie- Back ➢ Method of increase of Shear Strength of Soil- Cementation, Freezing, Electro-Osmosis, Compaction , Rock Bolting, Blasting at Toe ➢ Drainage System ➢ Application of Geosynthetics for hill slopes stabilisations ➢ Maintenance of slope protections structures
17:15-17:30	**Feedback, Concluding the Programme**