



The World Bank

Assessment and Analysis of the

Demand and Supply Gap in

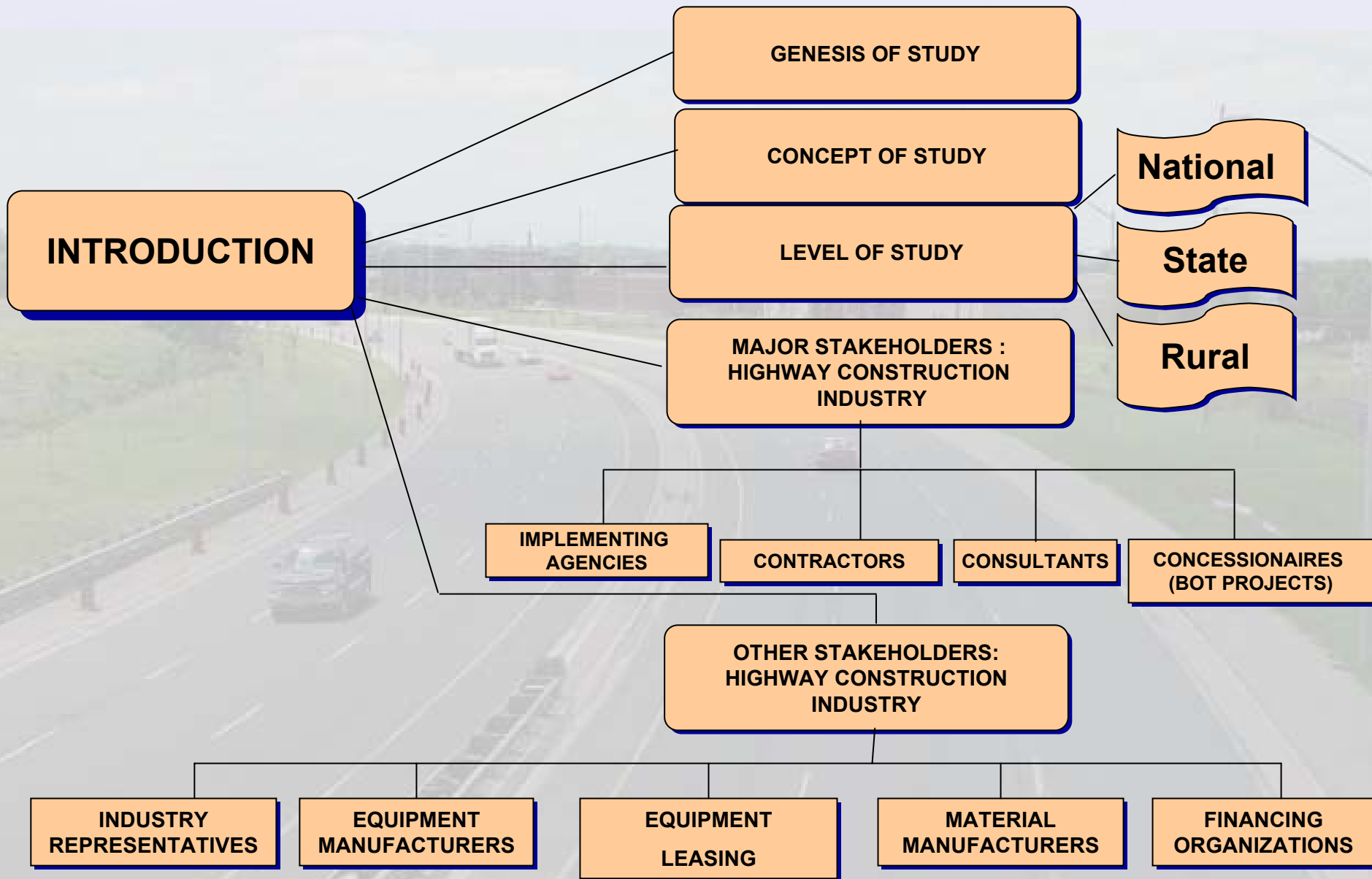
Indian Road Construction Industry/Development Programme

A Presentation



Consulting Engineering Services (India) Pvt. Ltd.

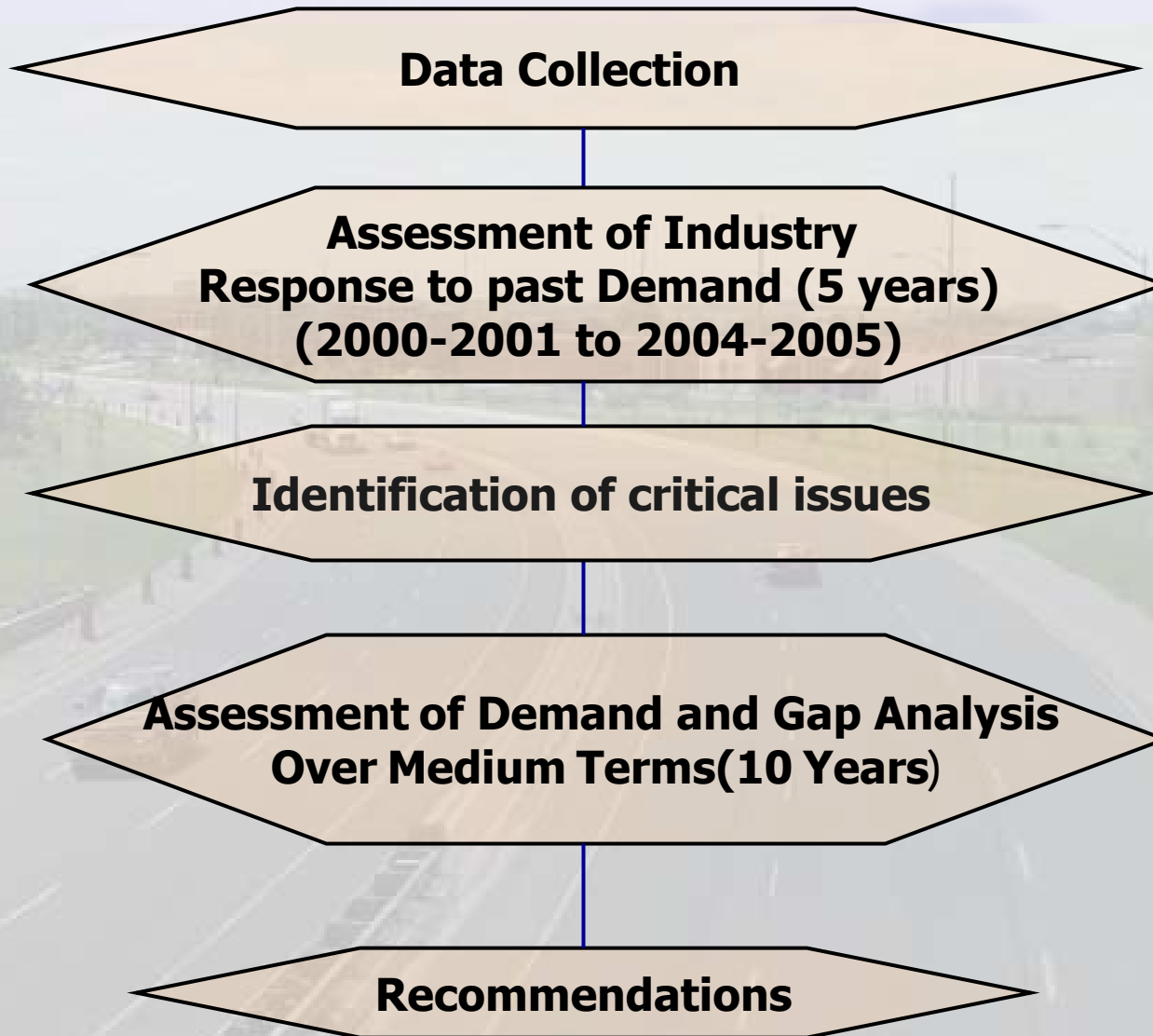
Introduction

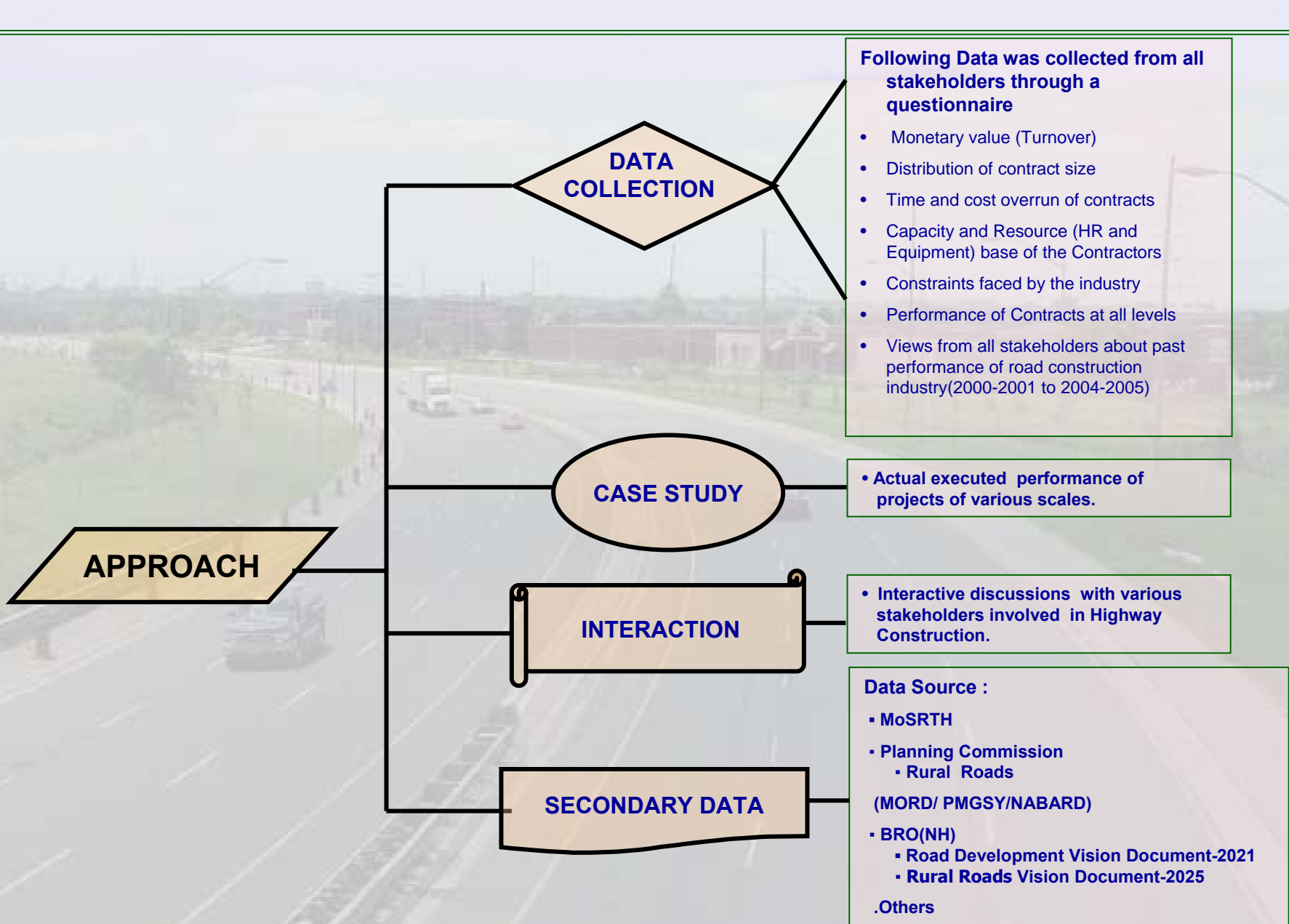


Scope of The Study

- ❑ **Study past development trends of highway construction industry**
- ❑ **Assessment of resources requirement for implementing the road development programme**
- ❑ **Identifying the ways to increase the capacity for implementing the said programme.**

Methodology





Data Sources/Sample Size

| S# | Department | Data Collection (Nos.) |
|----------|--|------------------------|
| A | Government | |
| 1 | NHAI | 1 |
| 2 | MoRT&H | 1 |
| 3 | State Road Authorities | 15 |
| 4 | Rural Roads (PMGSY), MORD & NABARD | 1 |
| 5 | Planning Commission | 1 |
| B | Contractors | |
| 1 | Large Domestic > Rs 125 Crores (>USD 27.77 million) | 7 |
| 2 | Medium Domestic Rs 40 to 125 Crores (USD 8.88 - 27.77 million) | 4 |
| 3 | Small Domestic Rs 5 to 40 Crores (USD 1.11 - 8.88 million) | 7 |
| 4 | Very Small Domestic less than Rs 5 Crores (<USD1.11 million) | 4 |
| 5 | Domestic (not entered in Road Sector) | 2 |
| 6 | Foreign | 4 |

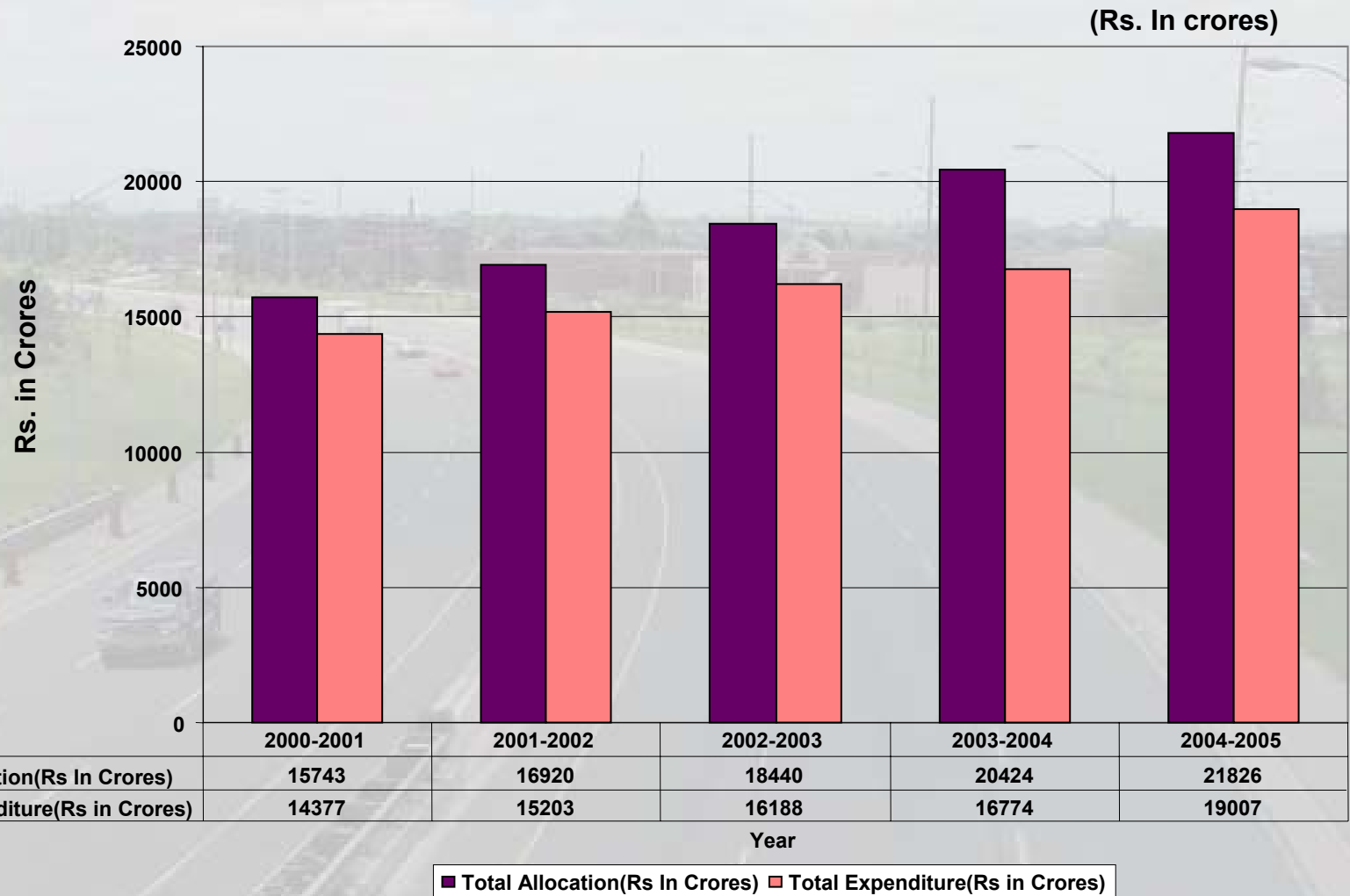
| S# | Department | Data Collection (Nos.) |
|----------|-----------------------------------|------------------------|
| C | Consultants | |
| 1 | Domestic | 4 |
| 2 | Foreign | 5 |
| D | Equipment Supplier | |
| 1 | Domestic Supplier | 7 |
| 2 | Domestic Hiring & Leasing Company | 2 |
| 3 | Foreign Supplier | 4 |
| E | Material Supplier | |
| 1 | Domestic Supplier | 3 |
| F | Industry Representative | 5 |
| G | BOT Concessionaire | 4 |
| H | Finance Institution | 4 |

Growth in Road Network

| CATEGORIES | 1951 (km) | Dec., 2004 (km) | % Growth | Percentage (%) of total length |
|---|-----------------------|----------------------------|-----------------|---|
| Expressways | Nil | 200 | - | - |
| National Highways | 22,255 | 65,569 | 194% | 2% |
| State Highways | 60,000 | 137,711 | 129% | 4% |
| Other roads including Major District Roads, Other District Roads & Village Roads | 318,000 | 3,383,344 | 963% | 94% |
| | 400,255 | 3,586,824 | 796% | |

- **Roads carry 85% of passengers & 61% of freight traffic**
- **NH constitute 2% length of road network but carry 40% of traffic**
- **SH & MDR carries about 25% traffic**

Allocation and Expenditure Scenario in Road Sector (Past 5 Years)



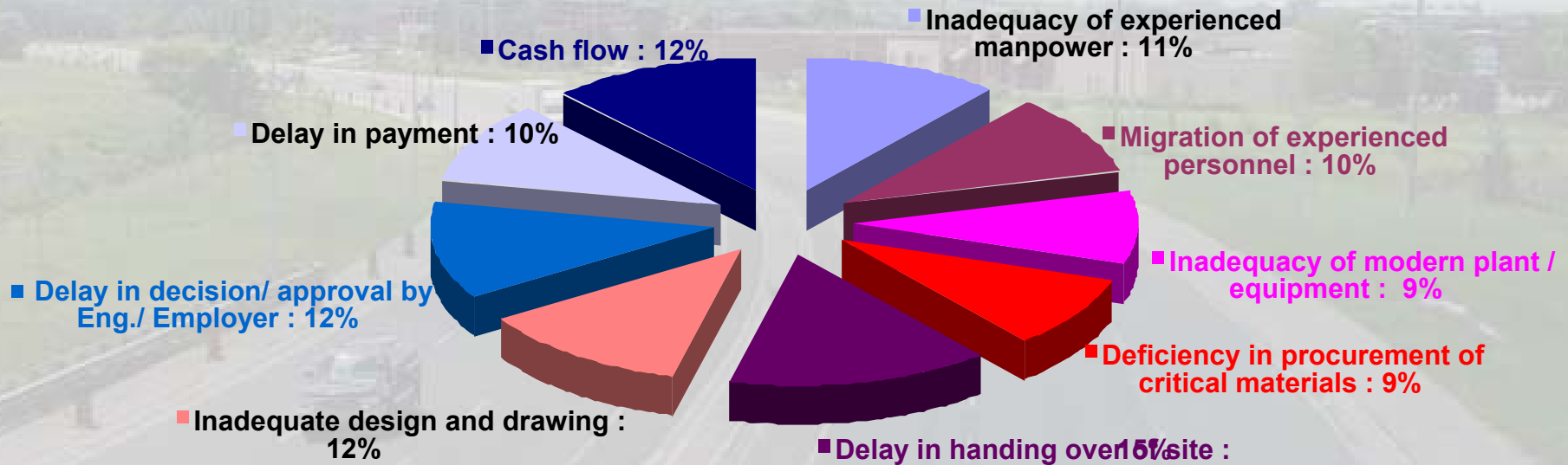
Road Construction Industry Response to Past Demand (Last 5 Years)

- 
- | Parameters Considered | Increase ranges (%) |
|---|---------------------|
| ➤ Monetary Value | - 6 to 45 |
| ➤ Human Resources | - 8 to 40 |
| ➤ Construction Equipments | - 7 to 32 |
| ➤ Cost Overrun normally | - 10 to 50 |
| ➤ Time overrun Normally | - 25 to 75 |
| ➤ Constrained faced by the industry in implementing planned programme | |



Constraints Perceived by the Industry

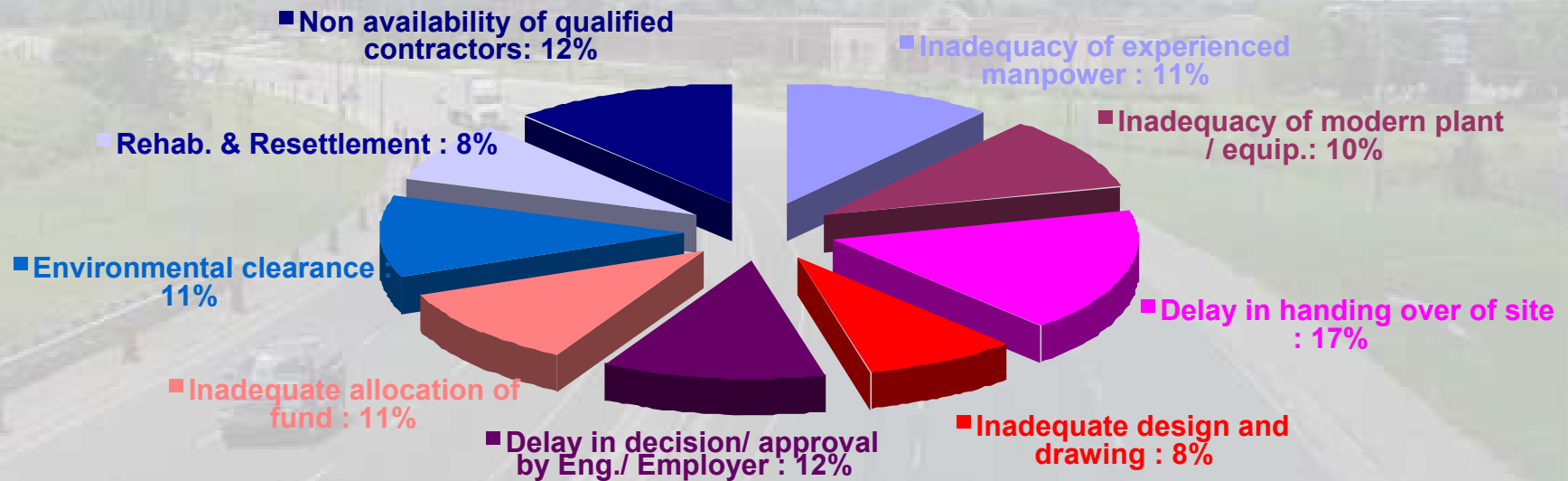
Constraints perceived by Contractors (combined) to meet planned programme



- Pre construction activities attributable to Employer 27%
- Other constraints attributable to the Employer/Engineer 22%
- Constraints attributable to the Contractors 51%

Constraints Perceived by the Industry

Constraints perceived by State agencies to meet planned programme



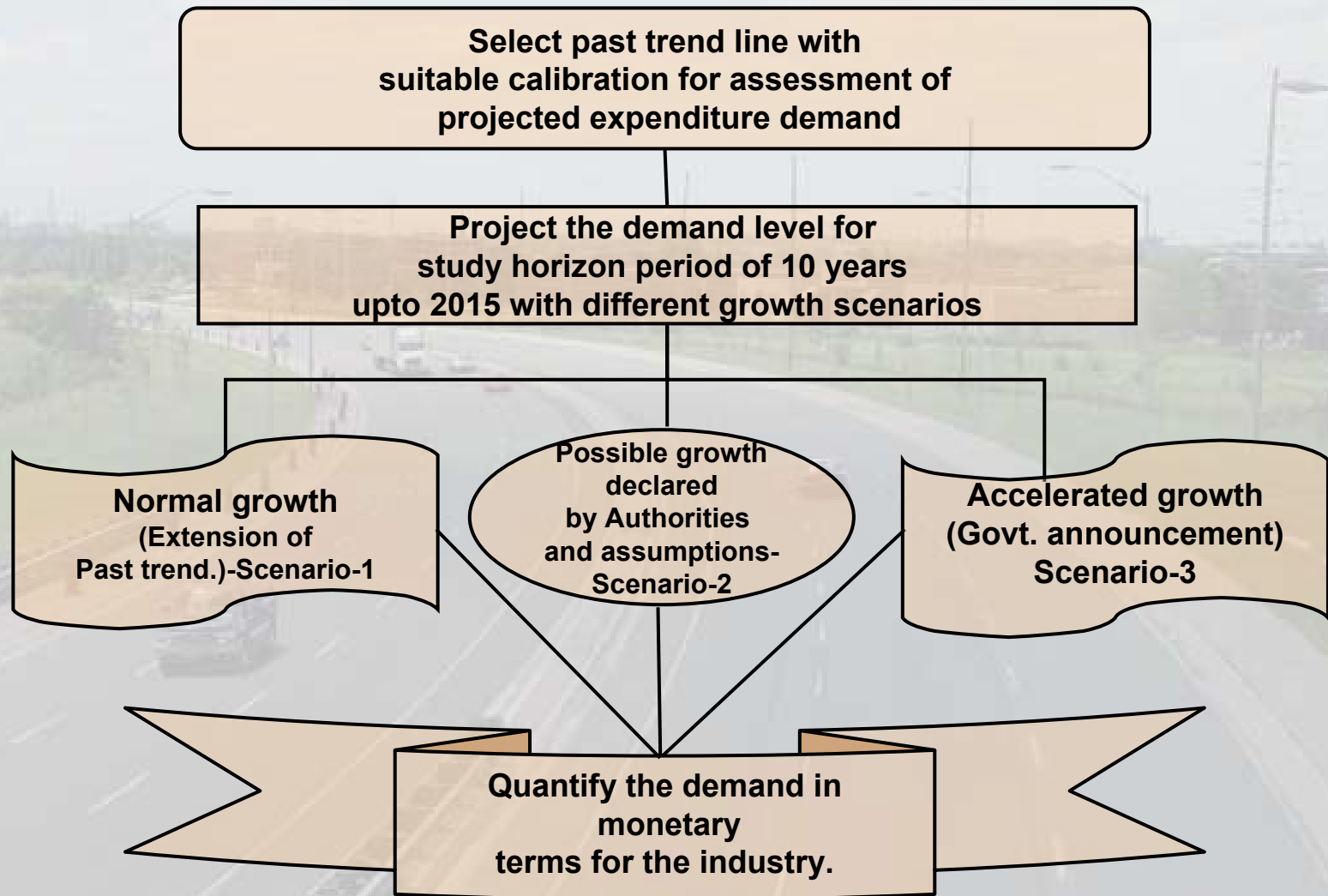
- Pre construction activities attributable to Employer 55%
- Other constraints attributable to the Employer/Engineer 12%
- Constraints attributable to the contractors 33%

Critical Deficiencies Constraining Road Construction Industry Capacity and Performance

Grouping of Constraints Perceived by State Agencies /Contractors

| Resource Related (% Impact) | | | Business Environment Related (% Impact) | | |
|--|-----------------|-------------|--|----------------|-------------|
| Factors | States Agencies | Contractors | Factors | State Agencies | Contractors |
| Contract Management | | | Working Environment | | |
| ▪ Inadequate Allocation of funds | 11% | 12% | ▪ Delay in land acquisition, Rehabilitation and Resettlement of Project affected persons | 25% | 15% |
| ▪ Non-Availability of funds in time | - | 10% | ▪ Delay in utility relocation | - | - |
| ▪ Inadequacy of Staff for Management for managing programme/contract | 11% | 11% | ▪ Frequent migration of experienced Staff | - | - |
| Contracting Industry | | | ▪ Other inter-departmental clearances e.g. delay in decision/approval by engineer/employer | 12% | 12% |
| ▪ Non-Availability of Qualified Contractors | 12% | 9% | ▪ Environmental Clearance | 11% | 10% |
| ▪ Non-Availability of Suitable Construction Equipments | 10% | 9% | | | |
| ▪ Inadequate availability of critical material | - | - | | | |
| ▪ Inadequacy of design/drawings | 8% | 12% | | | |
| Total | 52% | 63% | Total | 48% | 37% |

Assessment of Future Demand: Monetary Value



Assessment of Demand for Next Ten Years

Human Resources/Equipments/Contract Size

- ❑ **Assessment of demand and Gap Analysis for the next 10 years has been carried out for the following attributes :**
 - **Monetary Value (Turnover)**
 - **Contract Sizes**
 - **Human Resources**
 - **Equipment**
 - **Materials**

Assessment of Demand for Next Ten Years

Mathematical Modeling and Three Scenario

- ❑ **Mathematical Modeling have been used to develop demand equations with following structure:**
- ❑ **HR/Equipment-Dependent Variable (y)= f (Turnover (x))**
 - **Scenario 1 - The past expenditure regressed over the time has been considered. Normalized expenditure at 2004-05 prices has been considered and future expenditure has been generated.**
 - **Scenario 2 – The projections by various authorities associated with road development and vision documents published/being published by Govt. of India setting a mid-term goal.**
 - **Scenario 3 – The Scenario-3 incorporates the massive investment in the National Highways sector announced by Govt. of India to achieve accelerated growth during 11th plan period by 2012. The announced expenditure of Rs. 48000 crores on Rural Roads under “Bharat Nirman Scheme” has also been incorporated for the period 2005-2009.**

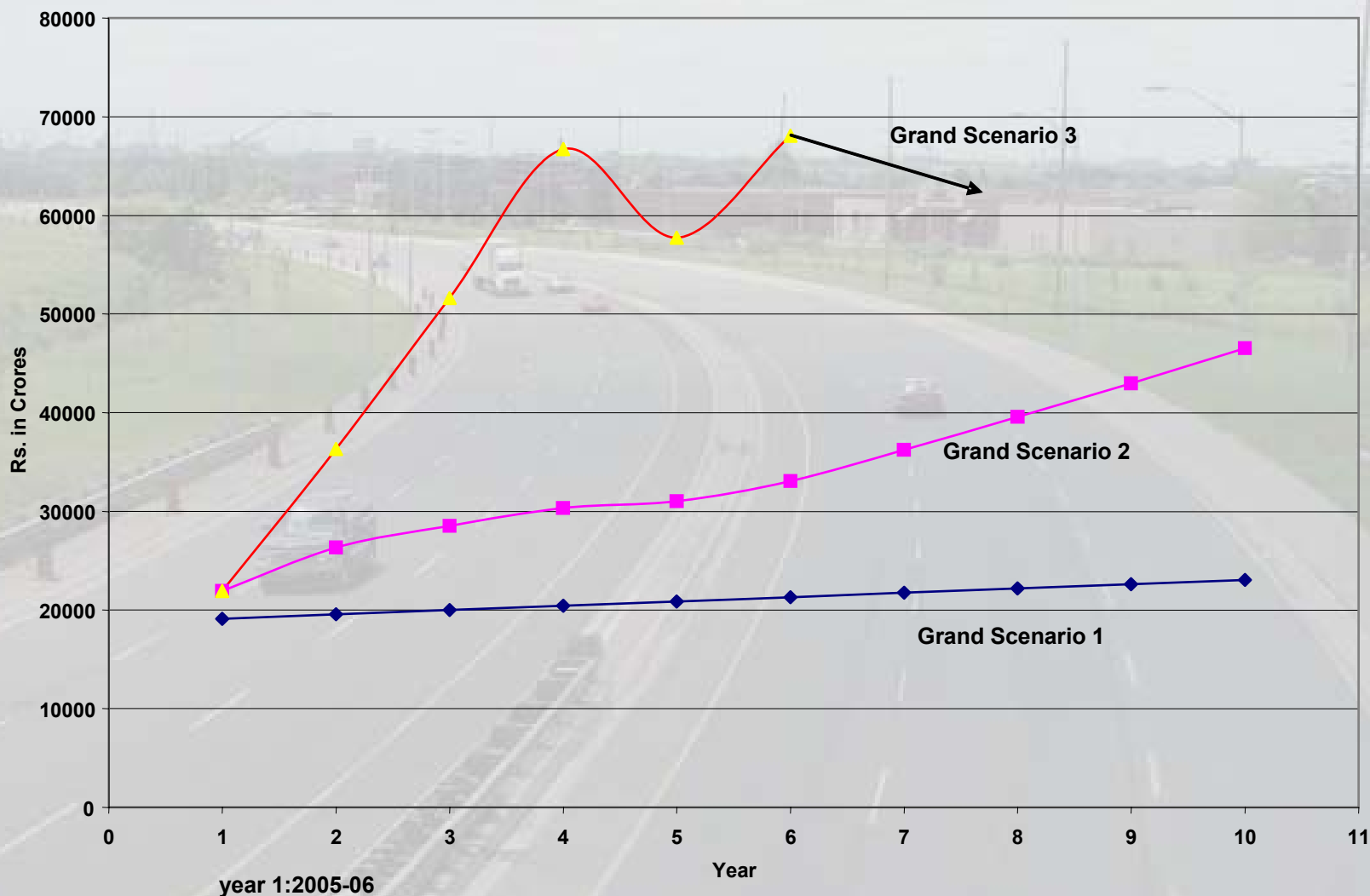
Assessment of Demand for Next Ten Years: Monetary Value (Rs. Crores)

Overall National Scenario (Monetary Value)

| Period | Grand Scenario-1 | Grand Scenario-2 | Grand Scenario-3 | Gap | |
|-----------|------------------|------------------|------------------|---------|---------|
| | | | | GS2-GS1 | GS3-GS1 |
| 2005-2006 | 19105 | 21902 | 21902 | 2797 | 2797 |
| 2006-2007 | 19542 | 26335 | 36331 | 6793 | 16789 |
| 2007-2008 | 19979 | 28530 | 51360 | 8551 | 31381 |
| 2008-2009 | 20416 | 30348 | 66721 | 9932 | 46305 |
| 2009-2010 | 20853 | 31031 | 57750 | 10178 | 36897 |
| 2010-2011 | 21290 | 33062 | 68075 | 11772 | 46785 |
| 2011-2012 | 21727 | 36237 | 79033 | 14510 | 57306 |
| 2012-2013 | 22164 | 39564 | | 17400 | |
| 2013-2014 | 22601 | 42962 | | 20361 | |
| 2014-2015 | 23038 | 46542 | | 23504 | |

Assessment of Demand for Next Ten Years: Monetary Value (Rs. Crores)

Grand Scenario Monetary Value



Assessment of Demand for Next Ten Years: Monetary Value

Maintenance Expenditure at all levels (i.e. NH/SH/RR)

All figures in Rs. Crores

| Period | Total | Contract Based Maintenance-Expenditure-60% of Total |
|-----------|-------|---|
| 2005-2006 | 7264 | 4358 |
| 2006-2007 | 11281 | 6768 |
| 2007-2008 | 11697 | 7018 |
| 2008-2009 | 12138 | 7283 |
| 2009-2010 | 12605 | 7563 |
| 2010-2011 | 13287 | 7972 |
| 2011-2012 | 14010 | 8406 |
| 2012-2013 | 14775 | 8865 |
| 2013-2014 | 15584 | 9350 |
| 2014-2015 | 16440 | 9864 |

Note :

- Assumed 60% of maintenance expenditure as Contract based
- State Roads figures upto 2009-10 are obtained from 12th Finance Commission Report
- Assumed 5% increase in yearly expenditure beyond 2009-10 for State Roads since 12th Finance Commission figures are available only upto 2009-10
- Assumed 10% increase in yearly expenditure for NH beyond 2006-07, since figures are available only for 2005-06 and 2006-07
- RR figures are computed from vision document 2025 (draft)

Assessment Of Demand for Next Ten Years : Contracts Sizes

Overall National Scenario : Distribution of Contracts (Size wise)

| Period | Size of Contracts | Grand Scenario-1 | Grand Scenario-2 | Grand Scenario-3 | Gap | |
|-----------|-------------------|------------------|------------------|------------------|---------|---------|
| | | | | | GS2-GS1 | GS3-GS1 |
| 2005-2006 | L | 80 | 122 | 122 | 42 | 42 |
| | M | 89 | 119 | 119 | 30 | 30 |
| | S | 2380 | 2506 | 2506 | 126 | 126 |
| | VS | 3341 | 4015 | 4015 | 674 | 674 |
| 2006-2007 | L | 81 | 176 | 260 | 95 | 179 |
| | M | 91 | 170 | 242 | 79 | 151 |
| | S | 2447 | 2725 | 4525 | 278 | 2078 |
| | VS | 3440 | 4091 | 7690 | 651 | 4250 |
| 2007-2008 | L | 82 | 171 | 396 | 89 | 314 |
| | M | 92 | 168 | 360 | 76 | 268 |
| | S | 2515 | 3399 | 6689 | 884 | 4174 |
| | VS | 3540 | 5284 | 11864 | 1744 | 8324 |
| 2008-2009 | L | 83 | 172 | 535 | 89 | 452 |
| | M | 94 | 172 | 482 | 78 | 388 |
| | S | 2582 | 3735 | 8687 | 1153 | 6105 |
| | VS | 3640 | 5801 | 15704 | 2161 | 12064 |
| 2009-2010 | L | 84 | 156 | 674 | 72 | 590 |
| | M | 95 | 160 | 602 | 65 | 507 |
| | S | 2650 | 4098 | 913 | 1448 | |
| | VS | 3740 | 6370 | | 2630 | |

L - Large Contract M - Medium Contract S - Small Contract Vs - Very small Contract

Assessment Of Demand for Next Ten Years : Contracts Sizes

Overall National Scenario : Distribution of Contracts (Size wise)

| Period | Size of Contracts | Grand Scenario-1 | Grand Scenario-2 | Grand Scenario-3 | Gap | |
|-----------|-------------------|------------------|------------------|------------------|---------|---------|
| | | | | | GS2-GS1 | GS3-GS1 |
| 2010-2011 | L | 85 | 158 | 812 | 73 | |
| | M | 96 | 164 | 722 | 68 | |
| | S | 1373 | 4489 | 992 | 3116 | |
| | VS | 5184 | 6997 | | 1813 | |
| 2011-2012 | L | 86 | 166 | 950 | 80 | |
| | M | 97 | 175 | 923 | 78 | |
| | S | 2784 | 4961 | 1118 | 2177 | |
| | VS | 3940 | 7685 | | 3745 | |
| 2012-2013 | L | 87 | 175 | | 88 | |
| | M | 99 | 186 | | 87 | |
| | S | 2852 | 5468 | | 2616 | |
| | VS | 4039 | 8444 | | 4405 | |
| 2013-2014 | L | 88 | 183 | | 95 | |
| | M | 100 | 198 | | 98 | |
| | S | 2919 | 6013 | | 3094 | |
| | VS | 4139 | 9277 | | 5138 | |
| 2014-2015 | L | 89 | 193 | | 104 | |
| | M | 102 | 210 | | 108 | |
| | S | 7226 | 16799 | | 9573 | |
| | VS | 12717 | 30591 | | 17874 | |

L - Large Contract M - Medium Contract S - Small Contract Vs - Very small Contract

Assessment Of Demand for Next Ten Years :

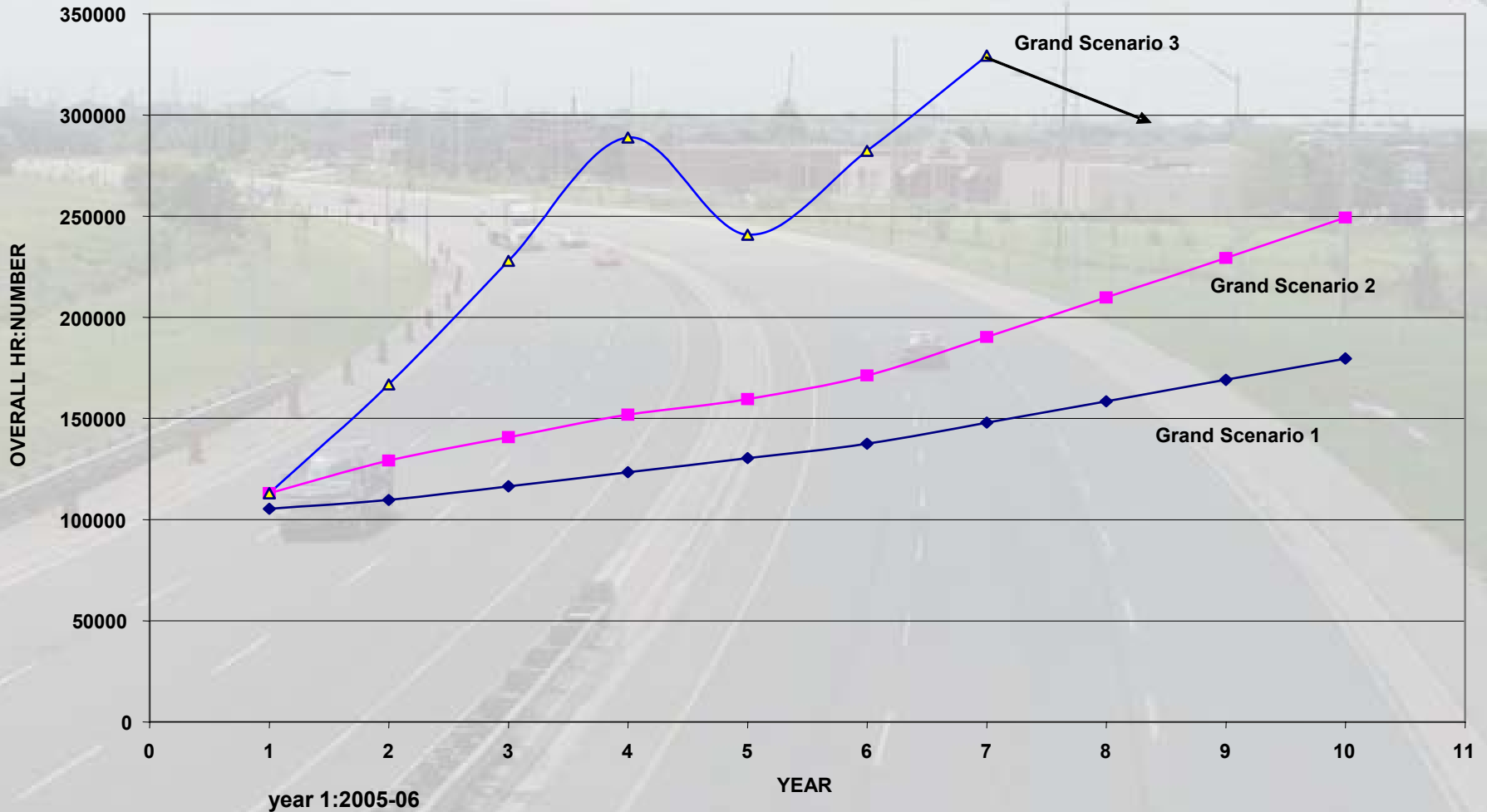
Overall National Scenario (Human Resources no.)

| Period | Grand Scenario-1 | Grand Scenario-2 | Grand Scenario-3 | Gap | |
|-----------|------------------|------------------|------------------|---------|---------|
| | | | | GS2-GS1 | GS3-GS1 |
| 2005-2006 | 105354 | 113057 | 113057 | 7703 | 7703 |
| 2006-2007 | 109672 | 129180 | 166809 | 19508 | 57137 |
| 2007-2008 | 116443 | 140683 | 227860 | 24240 | 111417 |
| 2008-2009 | 123436 | 151874 | 288836 | 28438 | 165400 |
| 2009-2010 | 130417 | 159560 | 240799 | 29143 | 110382 |
| 2010-2011 | 137487 | 171199 | 282188 | 33712 | 144701 |
| 2011-2012 | 147885 | 190308 | 329262 | 42423 | 181377 |
| 2012-2013 | 158424 | 209720 | | 51296 | |
| 2013-2014 | 169144 | 229271 | | 60127 | |
| 2014-2015 | 179662 | 249202 | | 69540 | |



Assessment of Demand for Next Ten Years : Human Resources

OVERALL NATIONAL SCENARIO : HR



Assessment Of Demand for Next Ten Years :

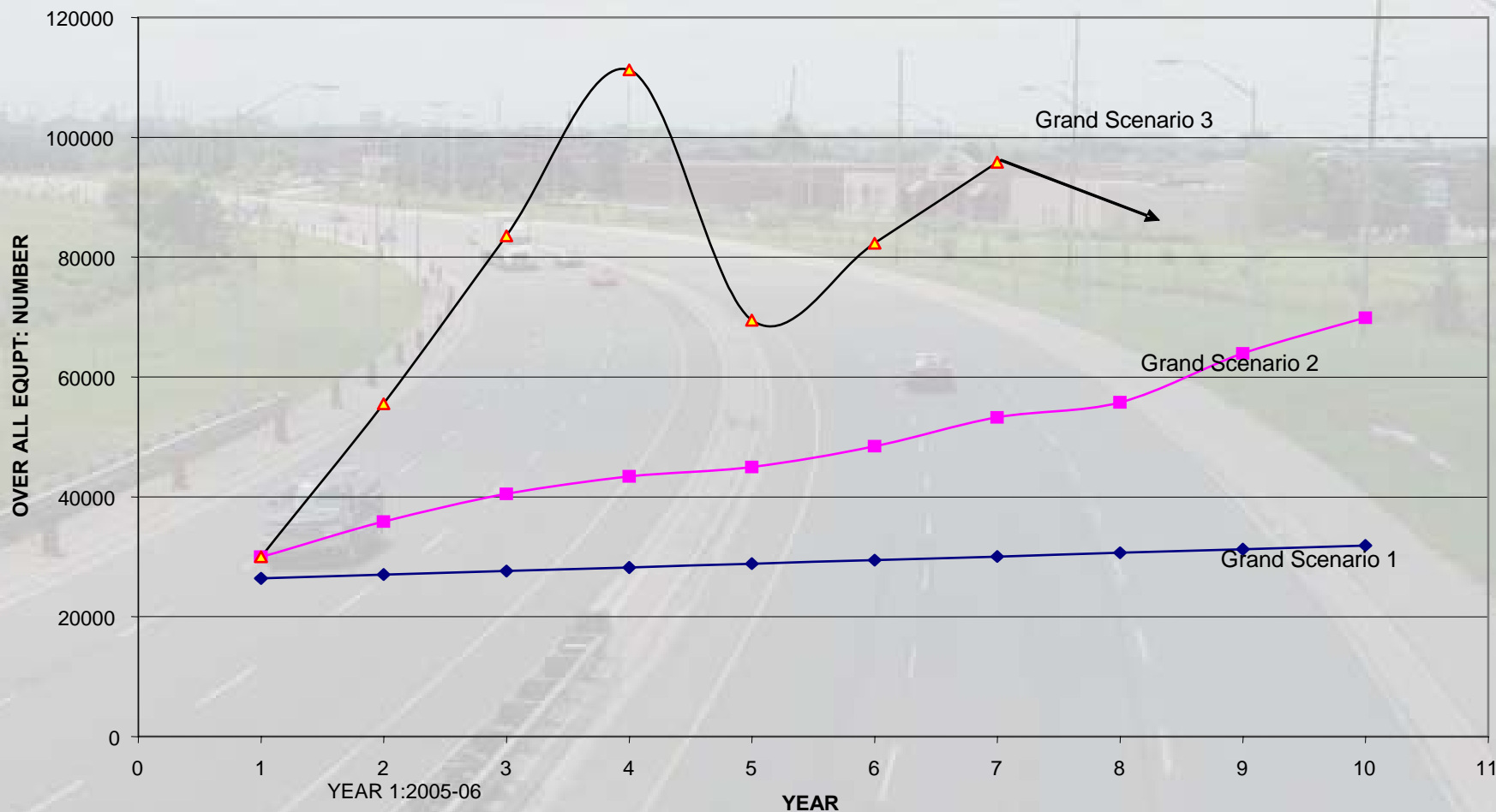
OVER ALL NATIONAL SCENARIO : EQUIPMENT

| Period | Grand Scenario-1 | Grand Scenario-2 | Grand Scenario-3 | Gap | |
|-----------|------------------|------------------|------------------|---------|---------|
| | | | | GS2-GS1 | GS3-GS1 |
| 2005-2006 | 105354 | 113057 | 113057 | 7703 | 7703 |
| 2006-2007 | 109672 | 129180 | 166809 | 19508 | 57137 |
| 2007-2008 | 116443 | 140683 | 227860 | 24240 | 111417 |
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| 2013-2014 | 169144 | 229271 | | 60127 | |
| 2014-2015 | 179662 | 249202 | | 69540 | |



Assessment Of Demand for Next Ten Years : Equipment

OVER ALL NATIONAL SCENARIO : EQUIPMENT



Supply of Materials (In Million Tonne)

| | Bitumen | Steel | Cement | Aggregate |
|--|----------------|--------------|---------------|---|
| Planned Annual Capacity | 6.37 | 88 | 255 | Production to be adjusted to meet the demand |
| Demand over medium terms-Grand Scenario-3 | 6.26 | 4.1 | 21 | 342 |

Recommendations and Action Plan

| Critical Issues | Recommendations | Action Plan |
|--|--|--|
| <ul style="list-style-type: none"> ▪ Inadequacy of Staff for managing programme/co ntract | <ul style="list-style-type: none"> ▪ Develop targeted training and awareness programme ▪ Review academic and experience criteria and make selected training programme ▪ International exposure required for technical officers. ▪ Emphasis be given to the areas of project management, equipment maintenance and operation, dispute resolution, contract administration and quality assurance. ▪ Separate funds should be allocated for development of skills. ▪ Shortage of Civil Engineers is critical due to the student preference is in the decline ▪ Career advancement needs to be linked to training. ▪ Skill development programme for road agencies to familiarize them with FIDIC/Standard Bidding Documents | <ul style="list-style-type: none"> ▪ Comprehensive Plan to be drawn up to increase capacity through high degree mechanized construction ▪ Specific guidelines, instruction and manuals should be developed covering: ▪ Supervision of civil works with emphasis on quality control ▪ Managing the construction process in a time bound plan. ▪ Remuneration of Civil Engineers to be adequate to act as incentive |
| <ul style="list-style-type: none"> ▪ Non-Availability of Qualified Contractors | <ul style="list-style-type: none"> ▪ Dispute Resolution Mechanism Programme for Agencies/Contractors ▪ JVs can be encouraged to bring in non-technical partners but good in financing and management ▪ Model Concession Agreement to make PPP attractive ▪ Promoting effective/meaningful Joint Venture between Foreign and Indian Construction Companies | <ul style="list-style-type: none"> ▪ For BOT/Annuity under PPP environment essential to have services of Financial Managers, Contract Specialist, Traffic and Transport Specialist and Legal Experts to minimize dispute and litigations in handling large financiers. ▪ Encourage SBDs throughout the country to cut down contract negotiation time ▪ Model Concession Agreement for National and State Highways ▪ Disputes to be resolved through fair arbitration |



Recommendations and Action Plan

| Critical Issues | Recommendations | Action Plan |
|---|--|--|
| <ul style="list-style-type: none"> ▪ Non-Availability of Suitable Construction Equipment | <ul style="list-style-type: none"> ▪ Establish a viable equipment hiring and leasing company as this would help in enhancing the capacity of the contractors ▪ Identify high-valued equipment items – motor graders, sensory paver finishers and vibratory compactors – to be in the inventory of the rental agencies ▪ Encourage hiring of surplus equipment of one contractor by another contractor to make best use of idle period ▪ Enhance the list of equipment qualified for import without customs duty (e.g. Hydraulically operated self propelled piling rigs for drilling holes of 1.5m and 36m depth) ▪ Liberalize procedures for import of equipment (without duty) to fully mechanize road construction to gain speed and quality | <ul style="list-style-type: none"> ▪ Utmost emphasis should be given for developing Road Construction Equipment Bank in various regions of the country. |
| <ul style="list-style-type: none"> ▪ Inadequacy of designs/ drawings | <ul style="list-style-type: none"> ▪ Monitoring and review of design and drawing by Design and Corridor Development Team (DCDT) and any defect identified to be rectified before commencement of contract ▪ System of penalty to be introduced for deficiencies in Design and Drawings submitted by outsource agency (Consultant) | <ul style="list-style-type: none"> ▪ Review of Design and Drawing to be mandatory assignment of DCDT as major preconstruction activity |





Thank You

