

C 4.4 ROAD BRIDGES AND RELATED STRUCTURES

Recommendations to Decision makers

Durability in design, construction and service life phases

- Durability must be considered explicitly at all stages: specification, conceptual design, detailed design, construction, inspection and maintenance.
- The increasing search for overall optimal financial performance for the whole life of such structures has raised the profile of questions of durability.
- Design standards increasingly respond to durability and decision makers should get involved in this process.

Cost-effective bridge management

- Network level analysis is essential to identify investment candidates that will maximise the return from available funding levels.
- All surveyed countries conduct a manual review of the system derived investment candidates to take account of budgetary limits and aspects of operation and maintenance of the road works not considered in the automated analysis.
- The relatively low weighting of financial aspects in the prioritization factors is probably related to the subsequent moderation process, which is managed by decision makers more than bridge engineers. Some more input is needed on this point.
- Unfunded priorities must be proactively and transparently managed.

Technical aspects

Durability in design, construction and service life phases

- The environmental conditions, which the infrastructure inhabits is of vital importance.
- Major durability problems emanate from poor construction (e.g. low covers to reinforcement), leaking deck joints, chloride attack (often associated with leakage paths from failed joints) and deck waterproofing failure. The significance of these factors depends on the severity of the environment and specific design practices.

Cost-effective bridge management

- Various prioritization methodologies and attendant factors have been adopted by the surveyed jurisdictions however condition/deterioration is the primary factor in the surveyed systems.

Recommendations to PIARC

Durability in design, construction and service life phases

- Recognition of durability problems has led in general to a shift in the design concept for short/medium span bridges towards eliminating (or reducing) deck joints by adopting integral bridges (or favoring continuous decks). Future work on these integral bridges could be developed by the PIARC Bridge Committee.

- The data set from the questionnaire provides a valuable reference point for bridge engineers to take an overview of the situation in their own country, and contrast it with the situation in other countries with similar conditions but with perhaps alternative approaches to mitigating durability problems, which may warrant closer examination.
- The durability topic is a very wide one and should be continued in future committees. For example, the impact of new materials on durability could be further investigated.

Cost-effective bridge management

Recommendations for future work that could be conducted on this subject include:

- Bridge performance measures and relative influence on prioritisation.
- Non-bridge factor influence on prioritisation with particular reference to financial factors.
- Methodology for evaluating bridge needs relative to other infrastructure elements.
- Mappings of condition/defect and treatment options and the relative efficacy of options.
- Deterioration model investigation covering the various deterministic, stochastic and artificial intelligence approaches or combinations thereof.