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# Paradigm Shift required to bifurcate carrying capacity of span of a bridge with that of its durability in structural investigation of long span bridges

R. K. Jaigopal

[csfc@rediffmail.com](mailto:csfc@rediffmail.com), [csfc@hotmail.com](mailto:csfc@hotmail.com)

C.E.O., Concrete Structural Forensic Consultants

#46, 2nd floor, 4th Cross, Sampige Road, Malleshwaram, Bangalore-560003, Karnataka, India

## 1. Introduction

Serious deflection in a long span bridge alerts engineers as it was in distress. Heavy vehicular traffic suspended on the bridge. It is followed by a detailed inspection and investigation. The investigation involves verification of existing engineering parameters through non-destructive and semi destructive tests to peep through the structural members, followed by a span load test. The results of chemistry of concrete investigated by NDT and semi destructive tests found to be not satisfactory, whereas span load test passed satisfactorily. Scene-2, a series of bridges in a single project failed to show minimum readings in internal integrity tests and engineers suggested for a span load test, so that if it passes in span load test, it can be certified as fit. Span load tests indicated bridges are in fit condition. Continuing further on both scenes the physical conditions i.e., load carrying capacity of the structures are certified fit, whereas chemical characteristics, like pH value, internal integrity and other internal parameters fail to reach satisfactory levels.

Here chemistry and structural parameters of concrete are pH value of concrete, internal integrity of concrete, existing compressive strength of concrete, chloride and sulphates ingress into the concrete and lastly the corrosion in embedded reinforcement. In order to distinguish between physical load carrying capacity and internal structo-chemical parameters, all later are bunched in one group and they are called as chemistry of concrete in a structural member. Any structure shall have perfect balance of chemistry and physical load carrying capacity, to have continued longer durability and any imbalance between these two characteristics will lead the structure to distress at faster pace.

## 2. Demand for durability in long span bridges

With the demand for prolonging durability of bridges gaining momentum from its owners, the durability parameter needs to be a primary engineering factor in investigation of bridges. Millau bridge as in photo-1 in France completed in the year 2004, has been designed, constructed and to be maintained for a period of 120 years and further scaling up, the Honshu-Shikoku bridge expressway completed around 1988-1998 in Japan, which has 17 long span bridges have been planned for design life of 200 years using preventive maintenance method. Photo-2 is Akashi Kaikyo bridge a part of Honshu-Shikoku bridge expressway