

## DISCUSSION FORUM

### Health assessment of structures using NDT

I must compliment you for bringing out the above issue highlighting important monitoring measures. Bringing professionalism to this important creative profession is an urgent necessity. Respect from the society can only be earned by projection of sustained durable works by the engineering fraternity. I had used NDTs some three decades back on some of the bridges constructed by the Indian Railways. The results gave a general standard of scattered nature. Now another method of mercury intrusion porosimetry is being suggested for assessment of strength of in-situ concrete. Its actual example where used may be quoted for the information of young engineers.

Unlike steel structures where standards are maintained through controlled fabrication and erection works in established organisations ensuring sustained life of more than 100 years, there is no such reliable system for RC works. It is the general observation as reported in the newspapers regarding structural failure of recently constructed structures due to Tsunami effect, that there is tendency to accept lower standards of works and violation of codal provisions. Many of the recently constructed over-bridges/bridges have also drawn adverse criticism from the media.

We must insist on standards of works of high quality with a clear foresight of what can happen in many vulnerable structures.

The code of ethics is hardly enforced by professional institutions/consulting organisations on such low calibre work.

Methods suggested by the authors for NDT measures must be categorised based on a large number of observations under Indian conditions of different categories of structures constructed. Technical audit may also have to be introduced to bring back professional reputation and earn reliability of the public.

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#### Reply by the Guest Editor

I thank Mr Bhattacharyya for his valuable contribution to the discussion on NDT of concrete structures. He has rightly identified the need for performance specifications and the need to carry out compliance testing on site after the structure has been constructed. However, there is a need to ask the following question — how close

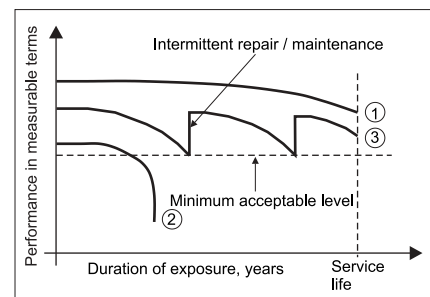
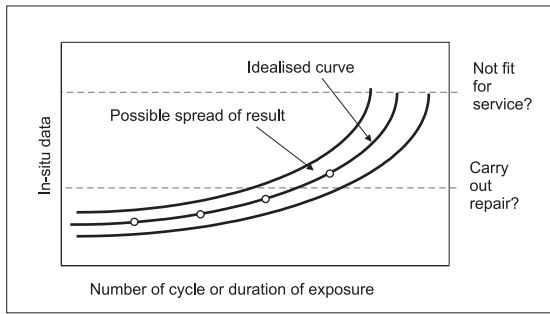


Fig 1 Performance history of structures in service

we are to develop performance specifications for the multitude of exposure conditions we encounter in our design and do we have related in-situ testing to determine the compliance in practice? My observation is that we are far away from achieving both these objectives.

As shown in Fig 1, the performance of a structure could decrease with time. The performance depicted by curve 1 may be achievable, but the cost of achieving this may not be justifiable for a majority of civil engineering structures. The performance represented by curve 2 is not acceptable and it is absolutely essential that designers, contractors and owners try to avoid the performance in curve 2. However, most



**Fig 2 The change in performance with time, measured using in-situ testing and monitoring**

structures follow the performance presented in curve 3, where there will be a decrease of performance, but timely intervention and maintenance could restore

with the specifications. It is inappropriate and unwise to assume that the status quo can be continued, where changing demands on resources will eventually be requiring a more systematic approach to deal with the

the performance to an acceptable level. It is in this respect that in-situ testing and monitoring will be invaluable, as shown in Fig 2.

A concerted effort is required to develop the performance specifications to cater to Indian exposure regimes and this has to be followed by developing limiting values for each of the types of tests which can be used to assess the compliance

durability of constructions. The task in hand is a huge one, requiring the cooperation of designers, consultants, contractors, material suppliers, researchers and standardisation bodies, such as the Bureau of Indian Standards, and it is better that this task is undertaken as early as possible. I hope that this discussion will continue until a national programme of research to develop performance specifications is initiated and appropriate testing and monitoring procedures are incorporated in such a research programme.

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