भारतीय प्रौद्योगिकी संस्थान रुड़की
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
सिविल अभियांत्रिकी विभाग
DEPARTMENT OF CIVIL ENGINEERING
रुड़की – 247 667, उत्तराखण्ड, भारत
ROORKEE-247 667, UTTARAKHAND, INDIA
Fax/फैक्स: 01332-275568, 273560
Tele/फोन : 01332-284319, 285219
E-mail/ई–मेल : civil@iitr.ac.in

SUMMARY OF HEALTH AUDIT OF TOWERS 1 to 7, BASEMENT & CLUB HOUSE OF UNITECH'S AMBER PROJECT, SECTOR 96, NOIDA

A. Structural health audit related observations

1. The health audit of already constructed seven towers (Tower 1 to 7), basement and club house of Unitech's Amber Project at Noida shows satisfactory results in general. No serious structural distress has been observed in the buildings under reference and they are found to be largely alright.
2. The non-destructive tests for evaluating quality and integrity of concrete on the basis of pulse velocity and surface hardness results in various RC structural members of buildings show satisfactory results at most tested locations. However, there are a reasonable number of locations in beams and columns of towers A-6 and A-7, where doubtful quality and integrity of concrete have been noted based on UPV results. Corrective measures need to be taken up to restore quality and homogeneity of concrete in these members.
3. An assessment of in-situ strength of concrete and thereby evaluation of compliance with the specified grade of concrete show satisfactory results in most structures except few towers and concrete grades. The columns of grades M30 and M40 have shown inadequate strength in Tower A6, while the Tower A7 has overwhelming number of beams and columns falling short in most concrete grades. The Tower A4 also has concrete strength inadequacy in columns of grade M40. All other members of towers are acceptable with respect to the strength results. In such deficient concrete strength members, the actual concrete grades have been computed, and the same are given in the report.
4. The durability vulnerability evaluation tests show satisfactory results and acceptable quality of construction with respect to the durability specifications in all the structures under reference. The chemical make-up of concrete with respect to the presence of chlorides, sulphates, carbonation and pH is found to be complying according to the acceptable standard values in almost all the structural members. Half-cell potential values did not show any active

corrosion in the RCC. The thickness of concrete cover has been found to be deficient though at many locations as pointed out in this report and all such locations would need appropriate corrective measures.

5. Examination of compliance of construction of RC structural members in terms of their number, sizes, reinforcement detailing and maintenance of correct construction records during the construction show the construction of various structural member to be complying the design specifications in general.

B. Rectifiable construction related deficiencies/ defects

1. A thorough visual inspection & distress mapping has shown construction workmanship deficiencies in some structural members of the buildings as marked in this report in detail. These deficiencies are honeycombing & incomplete section concreting, exposed reinforcement due to inadequate provision of cover thickness, surface cracks in RC members and few non-structural symptoms namely seepage marks and few construction issues with in-fill masonry walls.
2. While taking UPV measurements, visibly honeycombed or cracked locations were not chosen for testing as these locations anyway would yield unsatisfactory results. Such locations are already declared unsatisfactory on the basis of visual inspection and distress mapping.
3. As regards the exposed bars hanging through partially built members, will only be reused if no pitting or loss in section are recorded.
4. Recommendations have been made to repair those structural members where distresses and deficiencies have been reported in this report with respect to the health safety audit.

C. Concluding observations

The health audit of seven constructed Towers (Tower 1 to 7), basement & club house of Amber Project shows the construction to be largely in good health and in accordance with the design specifications, except some construction related deficiencies as mentioned in the detailed report. The structural adequacy of Towers A6, A7 and A4 needs to evaluated in view of the actual measured grades of concrete. It is expected that the client shall take due care in addressing the above-mentioned construction related deficiencies/ inadequacies.

Date: 10th October, 2023

10/10/23

Signature of PI

Dr. UMESH KUMAR SHARMA
Professor
Department of Civil Engineering
Indian Institute of Technology Roorkee
Roorkee-247 667, Uttarakhand (INDIA)