Structural assessment of the second Indian Research Station ‘Maitri’ in Antarctica and need for immediate replacement

Maitri, the second Indian Research Station was built in Antarctica during 1988-89. As against the original design life of ten years, it has already served as a permanent station for the last thirty years. Because of some damage observed in the structure, CSIR - Structural Engineering Research Centre (CSIR-SERC), Chennai, was asked to carry out 'Structural assessment of the Maitri Building in Antarctica' in 2003. Two scientists from CSIR-SERC participated as team members of the XXIII Indian Scientific Expedition to Antarctica and carried out the structural assessment of the Maitri Station during January-March 2004. During visual examination of the supporting structure, cracks were identified in nine supporting columns. Length of crack in the supporting columns of the main block varied from 7 cm to 50 cm and extended below ground level in some columns. It was physically seen that some cracks were through-thickness cracks for part of the length. An evaluation of safety of cracked columns was made and a possible repair measure was suggested. Blocks A and C of the station warranted immediate replacement. Data of acceleration obtained from Maitri during gusty winds was analysed using Fast Fourier Transform. The analysis showed that the structure was sensitive to dynamic wind action. This paper gives the details of work carried out, defects, damage and deterioration found in the structure, and observations made during the study. It is strongly recommended that an immediate replacement for the structure be taken up.