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## Effectiveness of advanced composites in repairing heat-damaged RC columns

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**Abstract:** Thirteen rectangular RC column specimens, constructed at 1/3 scale, were tested under axial loading to investigate the use of advanced composites in repairing heat-induced damage. Eleven of the column specimens were subjected to elevated temperatures of 500°C for three hours. Nine heat-damaged columns were repaired using carbon fiber reinforced polymer (CFRP) sheets and plates. The effects of wrapping configuration, thickness of wrapping sheets, inclusion of plates as externally-bonded longitudinal reinforcement and the area of plates were examined using seven repair schemes. Test results confirmed that elevated temperatures adversely affect the axial load resistance and axial stiffness of the columns while increasing their toughness. Buckling under pure compressive loads was evident in heat-damaged columns except in those repaired using longitudinal CFRP plates. Partial wrapping with unidirectional CFRP sheets was found ineffective in augmenting the axial load capacity and stiffness of the damaged columns whereas full wrapping increased their axial load resistance and toughness. Using externally-bonded longitudinal CFRP plates, confined with circumferential wraps, significantly enhanced the initial axial stiffness and axial load resistance of the damaged columns. However, none of the seven repair schemes investigated in this study managed to regain the original axial stiffness and load resistance of the undamaged columns.