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Technical Non-Destructive Evaluation of Burnt Bridge at CH. 57+450 Along Abuja-Abaji-Lokoja Road, Nigeria

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Abstract : The structural performance of bridges decreases progressively throughout their service life due to many contributing factors (fatigue, carbonation, fire incidents etc.). Around the world, numerous bridges have attained their estimated service life and many have approached this limit. The structural integrity assessment of the burnt composite bridge located at CH57+450, Koita village along Abuja-Abaji-Lokoja road, Nigeria, is presented as a case study and shall be forthwith referred to as the 'Koita bridge' in this paper. From the technical evaluation, the residual compressive strength of the concrete piers was found to be below 16.0 N/mm2. This value is very low compared to the expected design value of 30.0 N/mm2. The pier capping beam at pier location 1 has a very low residual compressive strength. The cover to the reinforcement of certain capping beams has an outline of reinforcement which signifies poor concrete cover and the mean compressive strength is also less than 20.0 N/mm2. The steel girder indicated black colouration as a result of the fire incident without any significant structural defect like buckling or warping of the steel section. This paper reviews the structural integrity assessment and repair methodology of the Koita bridge; a composite bridge damaged by fire, highlighting the various challenges of limited obtainable guidance documents about the bridge. The objectives are to increase the understanding of processes and versatile equipment required to test and assess a fire-damaged bridge in order to improve the quality of structural appraisal and rehabilitation; thus, eliminating the prejudice associated with current visual inspection techniques.

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