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STRUCTURAL CONDITION ASSESSMENT & REHABILITATION OF EXISTING STEEL FACILITY USING NON DESTRUCTIVE TESTS & LATEST CODAL PROVISIONS

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ABSTRACT

The existing codal provision for design of steel structure is based on limit state method and lots of research pertaining to its comparison with working stress method has been done. However, provision of handling design of existing steel structure which was previously designed as per working stress method, in current code is not elaborately addressed.

With this research, it is intended to formulate a procedure of refurbishing design of existing steel with use of latest code and future need. To achieve this, an existing steel structure facility with aggressive environment is considered. The case covers wind, seismic and temperature load effect on structure. Condition assessment of existing structure was carried out by visual inspection and various Non destructive tests (NDT) performed on random samples.

NDT test covers Ultrasonic thickness test, Hardness test and Coupon test on existing steel structure members, the change in design parameters and strength parameters. Analytical model of existing structure was created in STAAD Pro software, and design parameters as per existing strength identified through NDT were applied. Analytical results of failed members as per design procedure of latest code were studied and individual member wise refurbishment/ structural strengthening The analytical model of existing structure was further used to evaluate design results as per IS 800 1984 and IS 800 2007 before applying effect of NDT results to draw effect of existing loading condition and its effect on life of structure before indicating refurbishment and strengthening aspects.

KEYWORDS: Nondestructive test, Refurbishment, Steel structure, IS 800 2007, Limit state method.