

**ESTABLISHMENT OF CORRELATION FACTOR FOR
THE CARBON STEEL RODS TESTED UNDER TENSILE
LOAD AND THREE POINT BEND TEST**

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Degree of Master of Science in Materials Science

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AUTHOR'S DECLARATION

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ABSTRACT

Steel is one of the major construction materials which play an important role in the construction industry in Sri Lanka. The supply of durable construction materials is always identified as one of the major obstacles to improved construction in developing countries whether in the cities or in the rural areas. The reinforcement of concrete with steel rods is more safe, efficient and more economical. It has excellent bonding properties as well as high yield/proof stress and elongation. Most of the sales outlets do not provide information on the grade of steel. Hence laboratory testing to verify the steel grade is more essential before its use in construction purposes. Requirements for ribbed steel bars for the reinforcement of concrete are specified in SLS 375. It specifies two grades of steel bars: RB 460 and RB 500. Corresponding British Standard : BS 4449 issued in 2005 provides for three grades of steel, all of which should have a characteristic yield strength of 500 N/mm^2 (MPa) but differing in respect of other properties such as tensile / yield strength ratio and total elongation at maximum force. The requirements specified in SLS 375 cover, material requirements (chemical properties), dimensions and mass per metre, surface geometry, and mechanical properties (Tensile / Yield strength ratio) total elongation at maximum force. One of the main difficulties faced in quality assurance of the concreting steel bars (mainly 25mm and above) in Sri Lanka is the lack of facilities to determine the tensile strength, yield strength and elongation, which are the key parameters determining the quality of the material. Lack of standardized equipment having sufficient capacity to perform tensile tests often leads to incorrect quality assessments of the steel products. To develop a mathematical relationship between results of tensile test and three-point bend test for all available bar sizes of cold twisted bars and thermally treated steel bars are being measured and obtained the relations with 0.2% proof stress in tensile testing with 0.04% offset yield stress in three point bend testing for each bar diameters.

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