Experimental Investigation of R.C Beams Using New External Strengthening System Under Torsion Load

M. A. Yusuf [1, *], Nabil. M. Nagy [2], A. OSMAN [3], M. S. Zahran [3]

[1] P.G. student at Military Technical College Cairo, Egypt.
[2] Professor, Department of Civil Engineering, Military Technical College, Cairo, Egypt.
[3] Assistant Professor, Department of Civil Engineering, Military Technical College, Cairo, Egypt.

*Corresponding Author Email: mahmoud.yusuf19@gmail.com

Abstract. There are many problems in some concrete structures due to increased load or age of the structure, etc., this led to the search for solutions to avoid these problems. One of these problems is the twisting of the beams implemented in the structure, and on it appeared what is called Strengthening, which is what we will discuss in this research, which is improving the performance of concrete beams to limit the effect of twisting by using different systems. All of these systems are used after casting the beams, i.e. during the construction of the structure. In this research, five reinforced concrete beams were tested, the first is a control beam and the other four are strengthened by the near-surface mounted (NSM) method by using steel bars formed in the shape of the letter U. The difference between the beams was made in changing the distance between the pin beams [S] and the length of the overlap between the branches of these beams [Lo], and finally [a hook] of 50 mm length was made in the branches of the beams and fixed inside the beam section. The results showed the effective effect of these systems in terms of the beams' tolerance to the torsional moment, torsional angle, crack patterns and ductility coefficient of the Strengthen beams compared to the control beam.

Keywords: Torsion; Strengthening; RC Beams; Steel bars.