

Free vibration analysis of a cracked cantilever beam with two types of additional substructure attachment is investigated using ANSYS program. The cantilever beam is used as a master structure with single substructure attachment in various locations (as 1-DOF mass attachment and 1-DOF mass-spring attachment) with influence of crack in different location and depths. The results for the changes of the natural frequencies of a cracked beam are compared with the results produced by Vahit et al [1]. So the same geometrical properties have been studied. In additional work a cracked beam carrying two types of substructure attachment are compared with the results of the beam without a crack and with multi crack depth. In all calculations the beam has a uniform cross-section and the crack was modeled by reduction in the modulus of the beam. The reducing effects of the cracked beam on the natural frequencies had been more apparent with the substructure attached to the beam in different situations. The effect of mass-spring substructure is larger than the effect of the attachment when modeled as mass substructure for the same mass, with 17% for the first natural frequency and 2% for the second and third natural frequencies. The results can be used to identify cracks in simple beam structure; cracks have a clearer decreasing impact on the natural frequencies.