Voltage unbalance is one of the power quality problems deteriorating the performance of induction motors. The objective of this work is to assess and study the effects of voltage unbalance on induction motors IMs using the complex voltage unbalance factor model. The performance of the IM under unbalanced three phase supply voltage conditions has been assessed. Besides, this study compares the effects of scalar and complex modelling of voltage unbalance on the IM performance parameters such as torque, current, losses, efficiency and power factor. Different scenarios of unbalanced phase voltage magnitudes and angles are considered. The work deals with the influence of variations in the angle of the voltage unbalance factor on the stator and rotor currents, stator and rotor copper losses and total losses. It has been found that the variation of the phase angles creates an unbalance and has an effect on the IM performances which is underestimated in the works reported in literature