The gamma ray yield from a Prompt Gamma ray Neutron Activation Analysis (PGNAA) setup is a linear function of element concentration and neutron flux in the sample with constant bulk density. If the sample bulk density varies as well, then the element concentration and the neutron flux has a nonlinear correlation with the gamma ray yield [1]. The measurement of gamma ray yield non-linearity from samples and a standard can be used to estimate the bulk density of the samples.

In this study the prompt gamma ray yield from Blast Furnace Slag, Fly Ash, Silica Fumes and Superpozz cements samples have been measured as a function of their calcium and silicon concentration using KFUPM accelerator-based PGNAA setup [2]. Due to different bulk densities of the blended cement samples, the measured gamma ray yields have non-linear correlation with calcium and silicon concentration of the samples. The non-linearity in the yield was observed to increase with gamma rays energy and element concentration. The bulk densities of the cement samples were calculated from ratio of gamma ray yield from blended cement and that from a Portland cement standard. The calculated bulk densities have good agreement with the published data. The result of this study will be presented.