A research program at the Center for By-Products Utilization, UW-Milwaukee, is being conducted to develop new low-cost construction materials primarily using coal combustion by-products. This paper reports results of research performed to develop concrete mixture proportions information using fly ash and bottom ash in masonry products. The influence of different types, amounts, and sources of ash on compressive strength and bulk density of concrete are given in this paper. The influence of curing temperature as well as using bottom ash as a replacement of natural aggregates is also reported. It is concluded that low-cost construction materials can be reliably developed using coal combustion by-products at a large savings to producers and consumers.