This research was carried out to develop concrete mixtures incorporating used foundry sand. Eleven concrete mixtures including a reference concrete mixture were proportioned to obtain the 28-day compressive strength of 31 MPa (4,500 psi). Foundry sands (clean or used) were used to replace regular concrete sand. A Class C fly ash was used as an additional cementitious material up to 25% of total cementitious materials used. Density, compressive strength, flexural strength, modulus of elasticity, and abrasion resistance for all concrete mixtures were measured. Based on the results obtained in this investigation, it was concluded that structural-grade concrete can be manufactured using up to 40% used or clean foundry sand with or without Class C fly ash.