

裹壳工艺对疏浚底泥免烧骨料性能的影响研究

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摘要:以太湖疏浚底泥为原料,采用免烧法制备疏浚底泥免烧裹壳骨料,通过对免烧裹壳骨料进行壳层厚度和裹壳时间的工艺研究,探讨不同壳核质量比、不同裹壳时间对免烧裹壳骨料的粒径分布、堆积密度、单颗强度、筒压强度、吸水率和抗冻性等性能的影响。结果表明,对比不同壳核质量比的骨料,壳核质量比为5:7的骨料单颗强度达到2.78 MPa,筒压强度为7.58 MPa;在抗冻性方面,5:7骨料在20次冻融循环之后的质量损失率仅有1.99%。对比不同裹壳时间制备的骨料,其粒径分布和堆积密度基本一致,在强度方面,裹壳滚动时间为35 min的骨料相较于15 min的骨料,单颗强度提高了243%,为2.47 MPa,筒压强度可达7.06 MPa。综合比较,裹壳时间为35 min、壳核质量比为5:7时,骨料各项性能最好,分别为堆积密度820 kg/m³、单颗强度2.78 MPa、筒压强度7.58 MPa、1 h吸水率5.81%、20次冻融循环质量损失率为1.99%。

关键词:疏浚底泥; 免烧裹壳骨料; 裹壳工艺; 核壳结构

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Influence of Rolling Process on Characteristics of Non-Sintered Aggregate for Dredged Sediment

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Abstract: Dredged sediments unburned aggregate, which utilized the Taihu Lake dredged sediments as raw material were manufactured in an unburned process. The effect of different and different core shell mass ratio on the properties of aggregate was discussed through the process of rolling time and shell thickness, especially single strength, compressive strength, water absorption and frost resistance. The study results indicated that the size distribution and the bulk density of shell aggregate are basically the same in comparison with the aggregate prepared by different wrapping times. In terms of strength, the single strength of the shell rolling time of 35 min is 2.47 MPa, which is 243% higher than the aggregate of 15 min, and the compressive strength can reach 7.06 MPa. Comparing the aggregate of different core shell mass ratio, it was found that the single strength of 5:7 was 2.78 MPa and the compressive strength was 7.58 MPa. In terms of the frost resistance, the aggregate loss rate of 5:7 was only 1.99% after 20 freezing-thawing cycles. In comparison, the rolling time is 35 min, the core shell mass ratio is 5:7, and the aggregate performance is better, respectively, bulk density 820 kg/m³, single strength 2.78 MPa, compressive strength 7.58 MPa, water absorption rate 5.81%, and 20 times freeze-thaw cycle quality loss rate was 1.99%.

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