

Controlled Cracking for Industrial Concrete Waste by Steam Pressure Cracking Agent

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We propose a quick and controlled cracking method for industrial ceramic waste by applying a steam pressure cracking (SPC) agent. The agent is a non-explosive and low-vibration-type chemical, which was developed by one of the authors of this study. We prepared a concrete specimen that had a diameter and cylinder height of 150 mm. Several grams of the agent cracked the specimen. We could control the cracking better in water than air when the air and water conditions were compared. When tested in water, the agent was placed in the hole of the concrete specimen and ignited, and the specimen could be split into two or three pieces of the same size. However, using another SPC agent that was explosive, the concrete specimen was broken into small fragments and size of the concrete pieces could not be controlled. The crushing mechanism was different for the two cases. The explosive crushed the concrete mainly through elastic shock waves. However, the steam pressure cracking agent breaks the specimen using the steam pressure and shock waves. We demonstrated that the cracking can also be controlled using guide holes. This steam pressure method can be applied to industrial waste as a safe and well-controlled method.

Keywords : Steam Pressure Cracking Agent, Industrial Ceramics Waste, Recycling Process