

## ABSTRAK

### PENGARUH LAMA WAKTU *STEAM CURING* PADA BETON MENGUNAKAN AGREGAT KASAR BATU PUTIH YANG DITAMBAH ABU KETEL DAN *SILICA FUME*

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Meningkatnya kebutuhan produksi beton pracetak mendorong penerapan metode *steam curing* untuk mempercepat perkembangan kuat tekan beton pada umur dini. Penelitian ini bertujuan menganalisis pengaruh variasi durasi *steam curing* terhadap kuat tekan beton menggunakan agregat kasar batu putih asal Bandar Lampung dengan penambahan abu ketel dan *silica fume* masing-masing sebesar 5% dari berat semen. Penelitian dilakukan secara eksperimental dengan benda uji silinder berdiameter 15 cm dan tinggi 30 cm. Variasi durasi *steam curing* 2 jam, 4 jam, dan 6 jam, dengan pengujian kuat tekan pada umur 1, 3, 7, 28, dan 56 hari. Hasil menunjukkan bahwa *steam curing* efektif meningkatkan kuat tekan awal beton, dengan nilai tertinggi pada umur 1 hari sebesar 10,81 MPa pada BAS 3. Beton tanpa campuran (BTC) optimal pada durasi 2 jam, sedangkan beton dengan bahan tambah (BAS) optimal pada durasi 4 dan 6 jam akibat aktivasi reaksi pozzolanik. Namun, seluruh variasi belum memenuhi kuat tekan rencana  $f'c$  20,75 MPa pada umur 28 hari, yang dipengaruhi oleh kandungan kalsium oksida (CaO) pada agregat batu putih yang menyebabkan proses pengikatan beton belum optimal pada umur tersebut. Dengan demikian, *steam curing* dan bahan tambah terbukti meningkatkan kuat tekan awal beton, namun belum mampu mencapai kuat tekan rencana.

**Kata kunci:** *steam curing*, batu putih, abu ketel, *silica fume*, kuat tekan beton

## ABSTRACT

### ***THE EFFECT OF STEAM CURING DURATION ON THE COMPRESSIVE STRENGTH OF CONCRETE USING WHITE STONE AS COARSE AGGREGATE WITH BOILER ASH AND SILICA FUME ADDITIONS***

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*The increasing demand for precast concrete production has encouraged the implementation of the steam curing method to accelerate the development of early-age compressive strength. This study aims to analyze the effect of variations in steam curing duration on the compressive strength of concrete using white stone coarse aggregate from Bandar Lampung with the addition of boiler ash and silica fume, each at 5% by weight of cement. The research was conducted experimentally using cylindrical specimens with a diameter of 15 cm and a height of 30 cm. The variations of steam curing duration were 2, 4, and 6 hours, with compressive strength tests carried out at 1, 3, 7, 28, and 56 days. The results show that steam curing effectively increases early-age compressive strength, with the highest value at 1 day of 10.81 MPa achieved by BAS 3. Concrete without additives (BTC) was optimal at a duration of 2 hours, while concrete with additives (BAS) was optimal at durations of 4 and 6 hours due to the activation of pozzolanic reactions. However, all variations did not meet the target compressive strength of 20.75 MPa at 28 days, which is influenced by the calcium oxide (CaO) content in the white stone aggregate, causing the bonding process to be not yet optimal at that age. Therefore, steam curing and the use of additives are proven to improve early-age compressive strength, but are not yet able to achieve the target compressive strength.*

**Keywords:** *steam curing, white stone, boiler ash, silica fume, compressive strength of concrete*