as Al_2O_3, Fe_2O_3, SiO_2, CaO, and magnesium oxide (MgO), and such ash contents are left after combustion. The ash contents not only adhere to CaO generated by calcination, but also adhere to microparticles of CaO that forms remaining dust, disperse in exhaust gas, remain within a furnace, or are discharged from the bottom of a furnace, and typically are dealt with by surface and separation treatment (Reference 1: Fujio, Michitaka. "Operative Technology for the Beckenbach Lime Shaft Kiln (RSO), Journal of the Society of Inorganic Materials, Japan 7, 220-226 (2000)). These form a by-product or calcined dust that is obtained in a step of producing limestone.

[0021]

Calcined dust is powder containing not only microparticles of CaO but also ash content and the like, and thus displays a brown, gray, black, or another color in contrast to a CaO product that exhibits white. The color varies corresponding to the type of furnace, a component in fuel, and the like, and is one of colors defined in Appendix Table 1 in Japanese Industrial Standards (JIS) Z 8102: 2001 (Names of non-luminous object colors) such as sand, Gofun white, ecru, ivory white, silver dark gray, brownish dark gray, dark gray, greyish dark green, lead, gray, soot-colored bamboo, dark brown, ink black, black, iron black, silver, ivory, sky gray, pearl gray, silver gray, ash gray, rose gray, gray, steel gray, straight gray, charcoal gray, lamp black, or black.

[0022]

Additionally, in JIS Z 8102: 2001, the common colors listed above are permitted to be designated with modifier names using the terms defined in Table 3 in Definition 7.2 and Table 4 in Definition 7.3, and any of names of the common color listed above also includes a color modified by "light", "strong", "deep", "pale", "soft", "dull", "dark", "very pale", "light grayish", "grayish", "dark grayish", "very dark", or "medium", defined in Table 3 in Definition 7.2 and Table 4 in Definition 7.3 in JIS Z 8102: 2001 (Definition 11.2, Table 3 in Definition 7.2 and Table 4 in Definition 7.3 in JIS Z 8102: 2001).

[0023]

Fig. 2 shows a color of CaO as a product and a color of calcined dust. Fig. 2(a) shows powder of CaO as a product, the color of which is white. Fig. 2(b) shows calcined dust, which is gray in color.

[0024]

Calcined dust contains CaO, which is nevertheless present in a small content and does not display a certain color, and thus represents waste Ca

The measurement described above was performed by a method in accordance with JIS A 1108: 2018. A composition obtained using only normal Portland cement as a cementitious binder was designated as Normal composition, with the mass ratio of water/bond material (W/B) being set to 50%. A composition obtained using high-early-strength Portland cement and blast-furnace slag was designated as Slag composition, with the mass ratio of high-early-strength Portland cement to blast-furnace slag being set to 1:9 and the W/B being set to 47%. A composition obtained using commercially-available tancal was designated as Tancal composition, with high-early-strength Portland cement, blast-furnace slag, and water being used in the same amounts as in Slag composition, the mass ratio of high-early-strength Portland cement and blast-furnace slag to tancal being set to 3:2, and the W/B being set to 47%. A composition obtained using a material produced from calcined dust is designated as Calcined dust-produced material composition, with a material produced from calcined dust being used instead of Tancal in Tancal composition, the mass ratio of the same high-early-strength Portland cement and blast-furnace slag to the material produced from calcined dust being set to 3:2, and the W/B being set to 47%. It should be noted that the material produced from calcined dust is a material that is generated by reacting calcined dust with water and fixing CO_2 by adsorption, absorption, or reaction as described below and contains $CaCO_3$ as a main component.

[0051]

In the measurement, a sample casted in a framework was detached the next day, and subjected to standard curing (underwater curing at 20°C). The measurement results showed that Normal composition had a compressive strength of 39 N/mm^2 at a material age of 7 days and a compressive strength of 51 N/mm^2 at a material age of 28 days; that Slag composition had a compressive strength of 21 N/mm^2 at a material age of 7 days and a compressive strength of 26 N/mm^2 at a material age of 28 days; and that Tancal composition had a compressive strength of 42 N/mm^2 at a material age of 7 days and a compressive strength of 56 N/mm^2 at a material age of 28 days. By contrast, Calcined dust-produced material composition had a compressive strength of 53 N/mm^2 at a material age of 7 days and a compressive strength of 64 N/mm^2 at a material age of 28 days, and provided compressive strengths exceeding those of Normal composition, Slag composition, and Tancal composition. This revealed that a material produced from calcined dust can be sufficiently utilized as a mineral admixture for concrete.

[0052]