Research Progress of Building Materials Used in Construction Land

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Abstract. Construction land preparation is an important aspect of land remediation project. The research of materials in the process of land improvement is the foundation and the core. Therefore, it is necessary to study the materials that may be involved in the process of building land preparation. In this paper, the research on the construction materials such as recycled concrete, geosynthetics, soil stabilizers, soil improvers, building insulation materials and inorganic fibrous insulation materials, which are commonly used in construction sites, is reviewed and discussed in this paper. Land remediation project involved in the construction of land materials to provide reference.

1. Introduction
Construction land, refers to the construction of buildings, structures of land, urban and rural residential and public facilities land, mining land, energy, transportation, water conservancy, communications and other infrastructure sites, tourist land, military land. Materials used in buildings are collectively referred to as building materials. New building materials include a wide range of materials, insulation materials, insulation materials, high-strength materials, will breathe materials are all new materials.

2. Research on Recycled Concrete Materials

2.1. Study on Carbon Emissions from Recycled Concrete
Xiao-jiangzhuang and so on have studied the carbon emission of recycled concrete, and the quantification model of 1m³ recycled concrete carbon has been established under the life cycle. With the increase of the replacement rate of recycled coarse aggregate, the life cycle of 1m³ C30 is gradually reduced. Row of view, the recycled concrete than ordinary concrete has the potential to reduce carbon emissions, with a certain environmental value; recycled concrete in addition to the process will absorb CO₂, the storage period there are carbonization phenomenon. [1]

2.2. Study on Strength and Durability of Recycled Aggregate Concrete
Ding Dongting and other properties of recycled concrete were studied. When the recycled aggregate was replaced by ordinary aggregate, the compressive strength of recycled concrete was slightly lower than that of ordinary concrete, but the decrease was not significant. The anti-carbonation capacity of
concrete is less than that of ordinary concrete. The frost resistance of recycled concrete is much smaller than that of ordinary concrete. After 180 cycles, the mass loss rate is close to 3 times of the mass loss rate of ordinary concrete. Porosity is larger than that of ordinary concrete. At 28 days, the porosity increases by 49.5% compared with that of ordinary concrete. The porosity of 180 cycles of freeze-thaw cycle is 37.4% higher than that before circulation. [2]

2.3. Study on Creep Performance of Recycled Concrete
Huang Haisheng et al. studied the effect of fly ash and slag on the creep performance of recycled concrete. 70% of the recycled aggregate increased the creep of recycled concrete and the holding time was 360 d. The amount of fly ash is increased by 44.9% compared with that of ordinary concrete. The amount of fly ash mixed with fly ash and fly ash mixed with ore powder can effectively reduce the total creep and basic creep of recycled concrete. For the total creep of recycled concrete, the best content of fly ash mixed with fly ash and fly ash is 40%. For the basic creep of recycled concrete, the best mix of fly ash mixed with fly ash and mineral powder. The fly ash plus ore powder mixed with the effect of reducing the creep of recycled concrete is better than the single mixed with fly ash, relative to the same amount of fly ash mixed with single, fly ash plus ore powder 50% of the complex content of recycled concrete to reduce the total creep and the basic creep effect of the most obvious. [3]

3. Study on Geosynthetics

3.1. Study on Acid and Alkalinity of Nonwoven Geotextile
Xie Jingkun studied the acid and alkali resistance of non-woven geotextile. In the acid-base environment with pH = 2 ~ 10, polyester filament and polyester filament nonwoven geotextile were well tolerated. In the environment of pH≥12, the tensile tensile properties of the polyester filament nonwoven geotextile are completely lost in a short time, and the polyester staple fiber nonwoven geotextile is better tolerant than the polyester filament. In the strong acid environment, with the increase in the weight of polyester staple fiber and polyester filament non-woven geotextile performance are increasing trend; in the strong alkaline environment, with the weight of the increase in polyester filament non-woven geotextile Its tolerance to improve the performance is not obvious, while the polyester staple fiber non-woven geotextile resistance is gradually increased. [4]

3.2. Performance of Multi-layer Acupuncture Compound Nonwoven Geotextile
Jia Fang et al. studied the performance test of multi-layer acupuncture composite non-woven geotextile. The thickness of multi-layer acupuncture composite geotextile was slightly smaller than that of single-layer geotextile. With the specifications of the multi-layer acupuncture composite geotextile longitudinal and horizontal tear strength, vertical and horizontal tensile strength are higher than the one-time acupuncture formation of single-layer geotextile. Especially the top breaking strength, in different surface density, the same acupuncture density of multi-layer composite geotextile should be significantly higher than the single-layer acupuncture geotextile, and with the increase in the number of layers of this difference will be more obvious. The mechanical properties of multi-layer compound acupuncture geotextile are better than that of single-layer acupuncture geotextile, and the mechanical properties of acupuncture geotextile can be improved by multi-layer acupuncture compound. [5]

4. Research on Soil Reinforcing Agent

4.1. Study on Consolidation Ability of Four Non-aqueous Dispersant Reinforcing Agents to Sand
Zhou Shuanglin et al. studied the compaction ability of non-aqueous dispersion stabilizer to sand, and TOES (except for the production of ethyl nitrocellulose and Beijing Yi Li Fine Chemicals) was poor in performance (except for color difference) sand. [6]

4.2. Indoor Mechanics Performance of CBR PLUS Soil Reinforcing Agent
Cheng Guoqing and other experimental study on the mechanical properties of soil reinforcement.
For CBR PLUS reinforced soils, the strength growth in the dryer environment is faster than in the wet environment, which means that CBR PLUS reinforcement does not require special health measures in the field construction. Therefore, Good adaptability. [7]

4.3. Road Performance of TKB Soil Reinforcing Agent
Ningqiu and other TKB soil curing agent on the road performance were studied, the use of TKB do pavement grassroots, the road with indicators to fully meet the design standards, especially the early high strength, such as stabilizer stabilizer sand, the strength of 4 days to reach the design Claim. This is more difficult to seal the crossing, the urban area of the strong adaptability. Its durability and frost resistance to be further verified. [8]

5. Research on Soil Improver

5.1. FIMVAS Soil Improver Decomposition Synthesis of Organic Fertilizer Effect
Dai Jianhong et al. studied the effect of FIMVAS soil improver on the synthesis of organic fertilizers. FIMVAS soil improver is a far-infrared multi-level oscillating fossil produced by Taiwan Dongxin International Organic Co., Ltd., which can effectively improve the soil in the production of crops. Vegetable quality. FIMVAS soil improver decomposition of synthetic organic fertilizer as a base fertilizer application is appropriate to improve the soil, improve soil fertility and vegetable quality have a certain effect, but as a topdressing is not easy to operate, high labor costs, and widely used a lot of elements compared to water soluble fertilizer, No advantage. [9]

5.2. Effects of Biomass Soil Amendments on the Improvement Effect of Stroke Sand and Plant Growth.
Zhang Wei studied the improvement of soil physical and chemical properties, water characteristics and plant growth status of different soil biomass improver.
   The available N content increased by 57.98% ~ 227.91%, the available phosphorus content increased by 1485.18% ~ 4895.27%, the available potassium content increased by 74.31% ~ 261.03%, the total nitrogen content increased by 628.48%, and the content of available N was increased by 578% % ~ 1134.68%, total phosphorus content increased by 46.12% ~ 74.67%, organic matter content increased 742.76% ~ 2044.26%.
   The emergence and production of plants have different degrees of promotion. [10]

5.3. The Ability of the Superabsorbent Resin (Prepared By Solution Polymerization) to Improve Sand and Saline Soil
Qin Lei studied the preparation and application of new soil improver for soda saline and alkali. The sulfonated humic acid modified superabsorbent resin prepared by solution polymerization had a good effect on sand and saline soil. When the amount of superabsorbent resin is 200g / m3, the physical and chemical properties of sand and saline soil are improved obviously, the pH value of soil is decreased obviously, and the saturated water content of soil is obviously improved. [11]

6. Research on Building Insulation Materials

6.1. Ultra-Light and Efficient A-Class Fire-Based Cement-Based Insulation Materials
Liu Chengjian and other research ultra-light and efficient A-class fire cement-based insulation materials, by the International Engineering Co., Ltd., Tangshan Polar Bear Building Materials Co., Ltd., Beijing University of Technology jointly assume the "second five" national science and technology support project "new insulation resistance Research and development and application of ultra-light and efficient A-class fire-resistant cement-based insulation materials research and development and application of "ultra-light and efficient A-class fire-resistant cement-based insulation materials, according to the dry density is divided into 120,50 Two grades, 120 thermal insulation material thermal conductivity ≤ 0.050W / (m • K), compressive strength ≥ 0.2 MPa, can be used as insulation materials directly; 50 thermal insulation material thermal conductivity ≤ 0.040 W / (m • K) Compressive strength ≥ 0.03 MPa, can be used as insulation filler. [12]
6.2. Based on the Use of Solid Waste Insulation Materials
SEM test results show that the strength of the insulation material mainly comes from the bonding force between the cementitious materials and the embedding force between the foam glass pores and the cementitious material, not the pulp-aggregate interface. [13]

6.3. Preparation of External Wall Insulation Materials of Metakaolin
With the increase of the amount of water glass, the compressive strength of the insulation material is gradually improved, and the thermal conductivity and density are increased first and then increased. With the increase of the amount of hydrogen peroxide, the compressive strength of the insulation material is higher than that of the insulating material. Strength, thermal conductivity and density of the insulation material are increased slightly. With the increase of curing temperature, the compressive strength of the insulation material is gradually increased, and the thermal conductivity and density are gradually reduced. [13]

7. Study on Inorganic Fiber Insulation Materials

7.1. Mineral Cotton
Chen Xiangyu and other research on the application of mineral wool spray insulation technology. [14] Organic content. Mineral cotton in the organic matter is mainly produced in the process of adding dust and other ingredients, in order to ensure the mineral wool spray insulation layer of combustion performance classification and other properties to meet the requirements must be strictly controlled. Mineral wool in the organic content, according to " Slag cotton and its products "GB / T11835-2007 two groups of samples were tested, the test results of 0.1% and 0.3%, according to the test results, mineral wool organic matter content to be controlled at 0.1% to 0.3%.

7.2. Glass wool
Wang Haiyi et al. studied the structure and properties of microfiber glass wool insulation paper based on fractal theory. The pore structure of microfiber glass wool paper was analyzed by mercury intrusion method, and the fractal dimension of the paper was changed from 2.0 to 3.0, which indicated that the structure of microfiber glass wool paper showed fractal characteristics and its characteristics were obvious. With the increase of the beating degree of the fiber raw material, the fractal dimension increases, and there is a high positive correlation between the fractal dimension and the beating degree of the fiber raw material.

The higher the fractal dimension, the lower the thermal conductivity of the microfiber glass wool paper and the good correlation between the two, indicating that the fractal dimension can reflect the thermal conductivity of the microfiber glass wool paper to a certain extent. [15]

8. Conclusion
In this paper, through the literature reading and finishing, at the present stage of construction land involved in the process of building materials were summarized.

(1) Related to the building materials include: recycled concrete, geosynthetics, soil reinforcement, and soil improver, building insulation materials, mineral cotton, glass wool, aluminum silicate and other inorganic fiber insulation materials.

(2) The following aspects of the study were summarized: carbon sequestration of recycled concrete, strength, durability, creep performance; soil consolidation agent consolidation capacity, indoor mechanical properties and road performance; soil improver The effect of decomposition and synthesis of organic fertilizer, the improvement effect on the sandy soil and the improvement effect on the saline-alkaline soil; the performance of different kinds of building insulation materials; the study of mineral wool spray insulation layer, the dispersion of glass wool in water, study on inhibition and sound - absorbing properties of flame velocity and explosion overpressure.

(3) Through the above compilation and finishing, we have got a certain understanding of the research status of some building materials involved in the construction land at present, with a view to learning from the material research in the future.
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