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The Elementary Research of some Chinese Economically Valuable Construction Materials –Through an innovative management-way view in the construction of some sight-seeing attractions

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Abstract. This paper is just to talk about some 'crazy' construction materials. They are very strange and common to all of us, but quite applicable to our life shelters and useful for work-place's conditions as many kinds of functional materials. Their names are easily understandable, like Fumo-sand (Fluorine-film-sand), glass-sand, they are only sands, and the crazy sands can create miracles for the world. They are 'for-ever-green and golden'. Moreover, there are some other promising materials, such as bamboos, carbon-fiber-reinforced polymer (CFRP). And the idea of post-strengthening civil structures with carbon fiber reinforced polymer (CFRP) tapes was for the first time unveiled in an oral presentation at ETH Zurich in 1985 [1].The researcher will focus on researching them later on. These are not conceptual ones, but applicable and economically valuable things with much significance existing among the construction world. The researcher tries to think about them in an innovative-management-way, meanwhile, the cultivation of some construction materials will be quite helpful which can be used in the sight-seeing attractions' constructions, perhaps they are not only potential and promising but also valuable and economical.

Keywords: Promising material, Economical-and-valuable materials,.

I. Introduction

In an exhibition, we found that many strange and colorful bricks which are used for road-building and building-constructing. They are made not by the common construction materials but by Inner -Mongolian sands.

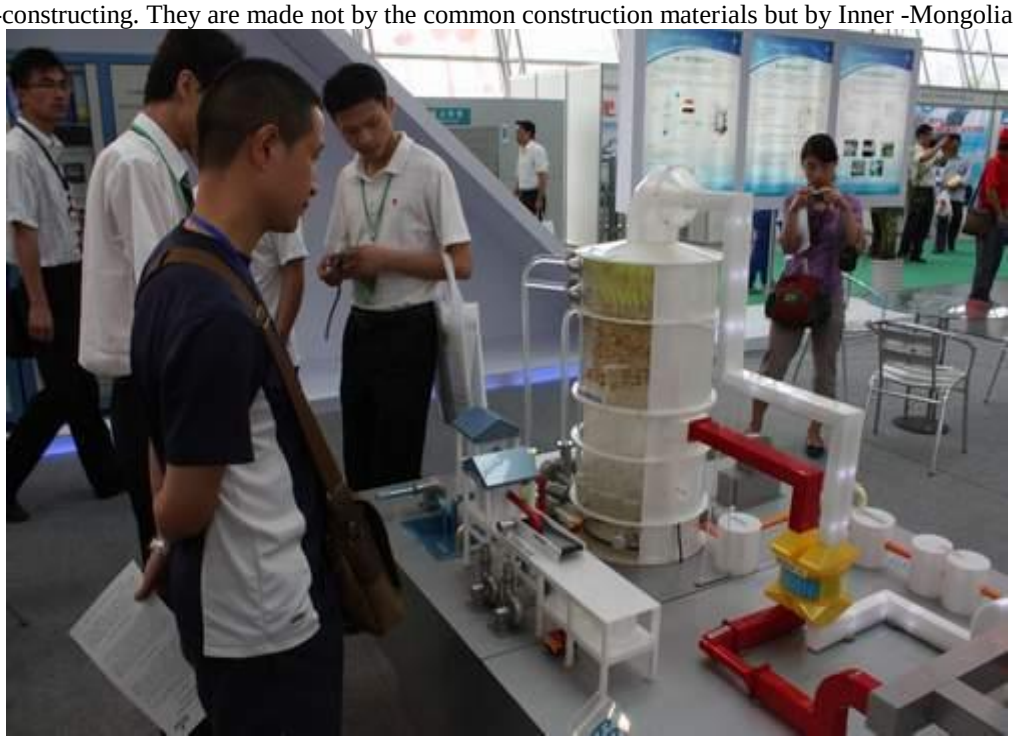

Figure 1: The permeable bricks' show in a Chinese Innovative Material Exhibition.

The charming materials have many advantages: natural but no radiation neither poisons，its most valuable feature is that it has very strong permeability. The researcher saw that in an on-spot-show in an exhibition, it showed that the dropping water permeated into the bricks quite soon, when the permeable bricks accumulated more water，the water permeated all the bricks and then flow out in other direction. We can control and pool the water

for preparation. These bricks are certainly made of the permeable sands; they should be used as pavement bricks and square sidewalks, especially in those sight-seeing attractions. In this way, the underground water can be much conserved through this water-permeable system. If we used them earlier than the rain-storm disaster in Beijing, the damage would be much less. There is only a little applications in Beijing Olymipics'establishments.

The other kind of innovative material is also a sand-made material. This sand-based-material will take place of those natural ones like marble-stone, granite-stone and synthesis-aluminum serving as brand-new construction-decoration materials.

The board of micro-crystal-material is also made from Mongolian sands. Today this new material is so practicable. These technology and management-way operations in terms of using the innovative materials are quite leading ahead of the world. They show successful applications in the future decades. Definitely they are promising and valuable later on. Some examples highlighted these applications, from Beijing Olympics' gym and 2013 Beijing Garden Expo gardens, these permeable bricks and its beautiful design have shown on the pavements and squares surrounding the spots.

II. The Explanation of the materials

2.1 The use of the materials

2.1.1 Permeable water bricks

The sand-made-bricks sometimes can help the construction building 'take breath', they are very good for human being's health. They can improve the air quality of indoors. We should develop this sand-based construction material. This is quite self-innovative and most tectonically advanced. Without burning, the sands can be made into permeable functional-performance bricks. The sands do not cost anything, there is too much in China's Northern-east area. They were formerly waste things but useful ones nowadays. The dessert will be a kind of green-material's pool; the highly resourced place will be more cultivated in a scientific way. They are colorfully beautiful, strong enough, endurable, fire-resistant and wear-resisting. The permeability makes the water through bricks permeate into the underground, which can be a kind of supplementary for the underground water resources. Because of the colorful beauty, they are quite suitable to construct the sightseeing attractions, squares and park-viewed pavement in gardens and parks. These places are very necessary to reuse the water, for watering the plants and flowers, for fulfilling the lakes or creeks inside (much use for the much-water used projects), for reserving the sustainable and environmental resource, for greening both our environment and our awareness. Due to the water reserved low inside the bricks' capillary holes, any airy dusts can be easily absorbed, at the same time; the lie concealed water can exchange the heat in the air. Therefore the temperature could be reduced; the 'heat-island' could be dismissed by this process. The cool air attracts more tourists to come, many sight-seeing attractions and parks are so comfortably suitable that the visitors are more willing to stay for long here and there within the eco-living environment. Our surviving around places will be improved accordingly, then the recreation and tourism business will be indirectly enhanced.

The authority suggests that the project be more widely used through the spreading technology by related science departments and city-planning departments. With the official financial-support, the project should be emphasized as a national important project. As the following policies come across, the taxation reduction, low-cost transportation fees and some exception of the related administrative charges through the special green-channel should be considered sustainably.

In this case, the public sight-seeing attractions、squares and tourism interesting places can be easily cheaply. That Chinese bureaucratic way of entrance ticketing system could be supplementary (not main) and less stressed in terms of the tendency towards the public's benefits.

On the other hand, the waste sand-bricks can be easily treated and distributed again in recycle system, this way is also green and sustainable. Some research institutions devoted themselves into researching these potential projects several months ago. In this respect, the government can subsidize these projects much more.

2.1.2 The Micro-crystal glass board which is made from Maowusu-sand

The other more valuable material is also made from sands. They are from the other area of Inner-Mongolia, which is called Wushenqi Autonomous District. It is a kind of wind-blown sand in dessert. These sands are the raw materials for making micro-crystal glass board through the process of floating-manner. This is already our Chinese patent internationally. It is invented by the technicians of the Mongolian Suliger Technical Company through many years' exploration. The standards highly surpassed the advanced world levels. They are quite cheaply, much cheaper than those marble ones. There are many kinds of uses in decorating the house and decorating the outside walls of the constructions. They are eventually high-quality materials in the name of high-graded constructions decorating materials.

2.1.3 The multiple-used sand-bricks

The sands can be multiple-functionally cultivated. They are for mining for any energy resources, for regulating watercourses, for making any art crafts, ceramic tiles, for producing mechanical-precision-casting material and even for oil-drilling as supporting materials.

For example, in order to reserve water to combat drought, the permeable bricks can be used in the construction of the agricultural irrigation works. The sands are firstly selected and refined. The new-made sands can block water without stopping air inside. If the new-made sands are paved inside the permeable-brick-built wells, the rain water will permeate through the bricks into the wells, then the water can be reserved inside the wells, they cannot be so easily volatilized. In case, the farmers can draw water from the wells as they like. It can form a recycled underground-water-system. The reserved water cannot be easily decayed either. It has too many other advantages. If necessary, the oil -drilling-wells need much impermeable bricks to block water but to permeate the oil, this technique is quite advanced in petrol drilling industry. They are not just sands, but golden and economical treasures of treasures.

As a matter of fact, presently, another Chinese innovative company produced three products: Shentai-sands, Fluorine-film-sand and Fushen-sand, they are mainly used in mechanic casting industry, petro-drilling industry and eco-construction industry.

2.1.4 The Carbon Fiber Reinforced Polymer (CFRP) material

The very promising system of CFRP straps as active external reinforcement in present time and to show successful applications these years. More and lacier and slender structural components of historic structures like in the matter of Chinese earthquakes are suffering cracking. It proves that internal, post-tensioning along three-dimensional boreholes with thin CFRP wires could be powerful tool to close the cracks. Within the last few years, including this year's earthquake happened in April, seismic retrofitting gained dramatically relevance. CFRP post-strengthening is a successful mean in many cases. Some modern architecture in China faces oscillation problems due to aerodynamic excitations. Instead of the subsequent installation of tuned mass dampers an adaptive outer skin made of electro-active polymers might resolve this problem. In particular, the post-tensioned CFRP straps provide confinement and enhance the performance of the concrete [2].

In terms of eco-construction industry, the top of the buildings and the walls of the houses can be cultivated in green and nice-viewed ways.

2.1.5 The feasibility of technologies for using bamboo as a useful constructing material

This technique is employed in middling and top-grade building construction, in architecture decorating and other major applications. The bamboo material is bearing technological process such as the laminated bamboo board, bamboo mat plywood processes, bamboo ceiling and wall-material technologies such as the bamboo particleboard, cement-bonded bamboo particle board and gypsum-bonded bamboo particleboard bamboo-fiber molding technology, bamboo architecture decorative materials and the floorings from bamboo fiber etc. The utilization of bamboo based construction materials has tended to replace the initially simple methods by cost-effective technologies using composites, high strength, high performance and high accessory values [3].

2.1.6 The pearlite mineral sands of Kangbashi New Area

It is used as warmth-keeping board, inside-and-outside warm board, sticky mortar and cement mortar, and wall-outface coating of warmth-keeping board. The proof layer is formed by combining the water-proof-and-cracking-resistance mortar with glass-fiber-net cloth together, while pasting the ceramic tiles, the steal-made nets will be hanged at first, meanwhile, while casting plastic anchors. The outfaced anti-cracking mortar can coat the ceramic tiles together.

2.2 The feature of these main materials

2.2.1 Permeable water bricks

The permeable brick each has many capillary holes, each hole has much room to reserve water inside. They are made by sands, which are called permeable pavers, or Eco-Bricks, they allow for natural storm water drainage and ground water recharge, making it ecologically sound and economically smart.


Figure 2: The outlook of the permeable bricks

With environmentally conscientiousness or simply being a fan of LID – low impact development，then the permeable pavers might be the right choice for mega events', like Beijing Olympics and Beijing Garden Expo spots. Ideal's permeable pavers offer an environmentally-beneficial pavement designed specifically to reduce storm water runoff, while offering beauty and structural strength for driveways, patios and walkways. The permeable pavers are designed with a notch in the sides so that when they are installed, a series of funnel-shaped openings are created that allow rain to drain through the pavement surface and infiltrate into the ground.

2.2.2 The micro-crystal glass board which is made from Maowusu-sand

After many years' research, the micro-crystal glass board is based Maowusu dessert -wind-accumulated-sands as raw material, They are too cheap to be challenged by other raw materials, too cheaply to be high-graded decorating materials. This is the first time to use this sand to make micro-crystal board. Micro-crystal material is called in the name of crystalline rocks material and glassy ceramics. It is made from glasses which are added into crystal-core-agent after being heated. It has too much micro-crystalline-pellet ceramic materials inside，it can take place those 'too-much' natural marble、granites and aluminum boards, Because of the lay-behind production technology presently, this innovative material is produced so limited that marble and granite ones are still the high-graded decoration materials in today's market. But they do cost too much, after mining, cutting, abrading and polishing, their price cannot be reduced down.

However, the cheap sands as so-much beneficial materials are in low price from the beginning to the end，in particular, the micro-crystal materials are cheaply made by floating methods, its cost is quite low and it has many excellent advantages like physical feature, chemical specialty and the beautiful effectiveness of the decoration outlook. They all look more beautiful than those natural marble et la. They are of cheap production, accessible obtain and advocated sustainability. It definitely plays a great role in world construction industry.

For example, they are employed in the process of The Ninth Beijing Garden Exposition's constructing. They are highly praised by the inner sectors.

2.2.3 Wind-accumulating quartz sand

It is a kind of wind-accumulating sands. In 1985, Shenyi Qin，a very promising enterpriser in the innovative material industry, tried to use wind-accumulating quartz sand to be the full-filling materials while making the precision instruments, he was laughed at then. Because the former one's expansibility rate could be three times of the Zircon-quartz, as soon as it is heated, the shape will be changed greatly. How can form the casting and coating materials to make precision instruments produce effectively? Through more than 6000 experiments among the 900 days, Qin was successful eventually. He successfully employed the Inner-Mongolian wind-accumulating quartz sand to take place of the Australian Zircon quartz sand. The formation material is used during the process of making precision instruments as forming, coating and casting material. The cost is too little to believe. A ton Zircon-quartz is priced RMB700, 000,000, but the Inner-Mongolian quartz sand is only 10 Yuan a ton. It is quite economically valuable. Many Chinese companies bought these materials.

2.3 The brief introduction of the pearlite-mineral sands of Kangbashi New Area

2.3.1 The feature of pearlite-mineral sands of Kangbashi New Area

Density（kg/m 3）	**Thermal conductivity**/（m.k)	**Compressive resistance**（Mpa)
100-160	0.2-0.4	0.042-0.048
160-240	0.4-0.8	0.048-0.068
260-400	0.8-3	0.07-0.09
450-700	3.5-7	0.1-0.15

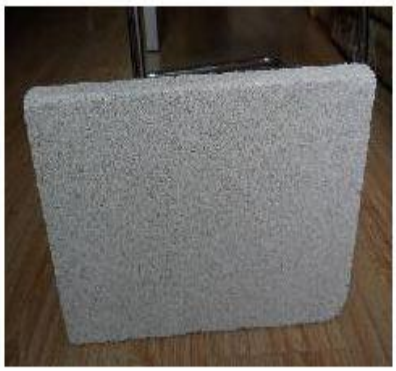

Figure 3: A1cement-foaming –and-warmth-keeping board; the Kangbashi pearlite-mineral sand

They are used as warmth-keeping materials for outside walls and surface of indoors. The thickness Averagely is 20mm-450mm according to the client's requirements.

The feature is that: it is a kind of unti-fire material, no poinson, environmental and loo-carbon. It is quite energetically encouraged as a promissing& innovative material the anti-fire ability is up to the highest level—A1-level.

There are many advantages like: high compressive strength, low thermal conductivity, consistant density. It can paste together tightenly with concretes, the longivity is the same with the construction buildings. They usually used as warmth-keeping boards of the buildings. The comfort level is usually up to the best-living condition, it is that, warm in winter, cool in summer. This is surely a very great contribution to the human-being's living. You can call this humanly and environmental values.

III. Summary : In an management way to think about the economical values of the materials

Refining the management of the materials' using is quite necessary. This is not only an integration of all these helpful resources but the other software things like idea, thinking-way, awareness and many related mechanisms. Macro-viewedly, the management way should be operated through an intelligent system from obtaining the innovative materials to the end application of them. The government is certainly the operator and leader of the operation to advocate the system's establishment.

For example, from digging out the sands to transporting them to the processing destinations, the officials should not charge anything. They are sustainable materials and products, not commercial goods. No fines through the express way, no stop through the whole way, they should be widely used in parks and squares, the beautifully colored decorations are quite energetically encouraged. From the central authority to the local government, from the top to the lower, from the bottom of our heart to use the valuable things economically and intelligently, these is our real common-wealth.

When we design the building, we should think about the materials' use in a state-of-art. Intelligent constructions should be advocated more from using the raw materials without any poisonous things and passive factors. The construction industry should develop in a very good way, the same as a way of art-style, a way of green, and a way of intelligence [4]. The state plays an important role to lead the way in construction coating-material area.

We should pay much attention to the sustainable raw materials' selection and the research of the combining prescriptions for producing un-poisonous products or un-damaged metallurgical products for the construction industry, the direction of the development is to seek after more functional values among the raw materials and to sustain the longevity of the constructions [5]. At the same time, the beautiful materials we found and created will decorate our living shelters. The beautiful things are from the deserted sands, they are not formerly waste an more, they are more valuable and economical now and in the future. The effectiveness can be created by innovation, state of art and intelligence. They do never exist separately, but comprehensively.

IV. Acknowledgement

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