

Multicolor Pavements Solutions™

Brief introduction

Ocean Power Industrial Co., Ltd was founded in 1980, which is a comprehensive joint-stock corporation in the fields of chemical, new engineering materials, equipment & electricity unification, food etc. Oceanpower has the functions of investment, R&D, design, production, sales, technologies and services. We currently have about 60 subsidiary companies and branches in all key-cities located in the Mainland China such as Beijing, Shanghai, as well as in Northern American, Europe, Southeast Asia etc.

In the engineering fields, Oceanpower actively takes part in making national applied standards on basic materials, moreover, we have cooperation with many famous universities and institutes to train personnel, develop new materials and technologies. Nowadays oceanpower has set up road & bridge construction material institutions located in South China, East China and Southwest which own strong technical force of scientific research. What's more, Oceanpower is also the first company to study and develop incorporate tinting system, dependently drafted out the national standard "building color expression" and a suitable "china building color card" which had passed the examination by "National standard sample technology committee" and become authoritative color standardization tool. After many years accumulation, now we adjust our resource and experience to make oceanpower Multicolor Pavement Solutions with individuation including multicolor programming & design, multicolor pavement & material select project, design, construction, after-sales service etc. we believe that it will be more suitable to Chinese environment color need on the aspects of pertinence and applicability.

After successfully applied for holding Beijing Olympic Games and Shanghai World's Fair, the need of color rise increasingly which will bring and promote high-tech development, and then create more rich and colorful life. Ocean Power would like to cooperate with personages of various circles to

depict magnificent language in the color world and achieve the uncommon future.

work process



1. Item investigation: We will investigate items character, landform, environment etc, try to know customer's needs and dig up sight expressive potential of items.
2. Color programming & design: Ocean Power R&D institute owns digital color institute which can according to fore-step investigation to make sight design and color programming for items with the most advanced design software.
3. Choose suitable pavement materials and technologies: The engineering technicians will combine item peculiarity to choose the most suitable pavement materials and technologies according to investigation results.
4. The design of configuration and material: Ocean Power R&D institute owns Road & Bridge Construction Materials Institutes that design projects for pavement structure, material constituent and construction technology.
5. Multicolor pavement: we will guide multicolor pavement items construction.
6. After-sales service: we will train relevant personnel to maintain and conserve multicolor pavement, and make item long-track observation.

products introduction

Flexible multicolor asphalt pavements

Modified multicolor asphalt paving binder of Oceanpower RoadPower system is made use of overseas advanced technology. The plasticity has rose

highly, because it has been added into the macromolecule-modified agent to produce according to asphalt mixture National standard. It is proved that the mutability of modified multicolor asphalt paving binder is better than the common asphalt, and as far as environment protection, it can reduce carcinogen, such as 3-4 Benzene derivatives in black asphalt.

The advantages of RoadPower multicolor Asphalt pavement

- * Beautify the environment to give people better feeling
- * Good for traffic management and relieving traffic to reduce accident.
- * New sight was formed which appeal to more visitors if it was used in park, square, etc.
- * Multicolor pavement is suitable for city construction requirements of “colorfully, greenly and lightly”.
- * Modern city style is displayed; it is accordant with international style and good for inviting outside investment.
- * Technology is improved which is good for high-tech achievement to meet with international.
- * Comprehensive competition would be improved which would outstanding promote houses sales if it is used in area.

Properties of multicolor Asphalt binder

Item	OPAH-50	OPAH-70	OPAH-90	OPAH-110
Penetration (25 ,100g,5s)(0.1mm)	40-60	60-80	80-100	100-120
15 Ductility (cm)	80	100	100	100
Softening point ()	49	45-46	44-45	43

Property of RoadPower modified multicolor Asphalt binder is conformed to the requirement of National Standard to A grade of pavement Asphalt.

Oceanpower RoadPower multicolor Asphalt pigment is a series products

which was produced by oceanpower Engineering Technologies Co., Ltd depending on the technical of Oceanpower Color Technologies Co., Ltd, having the features such as color lively, quality steady, etc. At present, the series have red; green; yellow, etc and also can design the color as consumer's demand. For example:

*Iron red is conformed to “ People’s Republic of China State Color Standard GB-6.3R4.5/5.6”

*Saffron is conformed to “ People’s Republic of China State Color Standard GB-8.1YR5.5/4.8.

*Peak green is conformed to “ People’s Republic of China State Color Standard GB-6.9GY3/1.8”

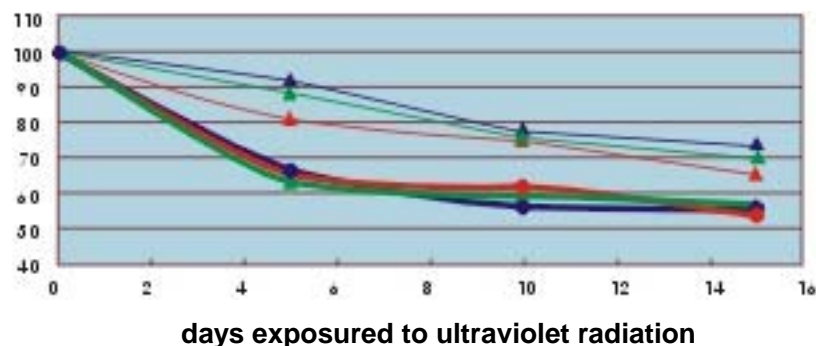
Property of multicolor Asphalt mixture

1.Pavement property

Binder content %	Use of mixture	Number of blow marshall compaction	Stability kN	Flow value 0.1mm	Remaining %
6.0	Cattle way	Double blow maxshall compaction 50times	4.6	20.5	82.6
6.0	Auto way	Double blow maxshall compaction 75times	6.7	29	83.5

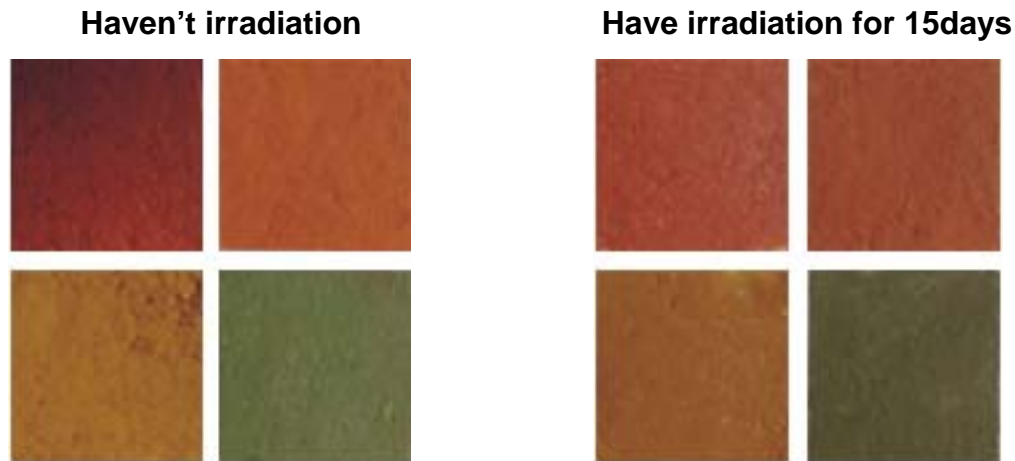
2.Color stability

RGB percent (%)



Using ultraviolet radiation as sunshine to shine the model for one hour, its effect as sunshine for a day, otherwise, effect of irradiation by ultraviolet

radiation for fifteen days is the same as sunshine for a year. The test was carried out in close environment with the temperature of 57 degrees, which was almost the same as the temperature of Asphalt pavement.



Design and construction of colorful Asphalt pavement structure

(1) Heavy traffic road is often designed as three Asphalt concrete pouring structure (bottom, middle and surface), Asphalt of bottom and middle is black, on surface, it is colorful.

(2) Middle traffic road is often designed to two Asphalt concrete structure (bottom and surface), bottom is paved with black Asphalt; on the surface, it is multicolor.

(3) Light traffic road, footpath, bike lane, sightseeing way, etc. are often designed to single colorful Asphalt concrete structure.

(4) The choice of surface colors must consider some problems, such as the hue of environment, the road traffic, the difference of the color itself, standing neatness and lasting long, etc.

(5) The original concrete surface was changed into multicolor Asphalt pavement and the pavement condition must be taken into consideration. It has to do something for preventing reflecting crack and keep drainage design.

Mixing of multicolor Asphalt aggregate: If mixing multicolor Asphalt mixture, you can use Asphalt equipment in existence. Before mixing, it is necessary to clean the mix crock and prevent black pollution. Products are

designed to prorate, adding to mix crock directly. It is better to increase the mixing time for mixture color symmetrical.

Construction of multicolor Asphalt surface should make reference to the construction arts of black Asphalt pavements.



Multicolor skid-proof surface

Multicolor skid-proof surface has already widely used in European countries but rare in China. The application of the multicolor skid-proof surface could not only good for relieving traffic congestion, but also efficiently prevent and control traffic accident. Drivers are proposed to travel in the prescribed ways to avoid confused running of different vehicles through different colors of the road made in multicolor skid-proof surface. The skid-proof effect would be showed up if signaling the dangerous roadway to drivers together with supplying surface of high friction force. Various colors, skid-proof effect & lowering noise and conveniently construction are the three outstand advantages of the Oceanpower multicolor skid-proof surface when applied to.

Oceanpower multicolor skid-proof surface is a skid-proof system of resin pavement, including modified Color Binder with special recipe and varied Aggregate of different sizes (including natural Color Aggregate and synthetic Color Sand), of which always to pave the asphalt pavement or cement pavement with an exactly number. The advantages of this surface not only lie on obviously improving sight and road safety, but also extend the life-span of ordinary pavement due to its abrade resistance. Our corporation not only

supplies all match product of the multicolor skid-proof surface, but also concerns with the construction of multicolor skid-proof surface, owning professional construction groups and plants together with abiding strict construction arts. At present, the corporation could provide color road surface of red, green, and yellow, blue with permanence of color.

Principal uses



1. Bus lane



2. Bicycle lane



3. Parking lot



4. Cross road



5. Sightseeing road



6. Speed-down belt

Advantages

1. Simple, varied construction and low cost

Multicolor skid-proof surface is not only suitable for mechanism construction with large-scale, but also fitted for manual work with low cost and small-scale. On the place where is not suitable for mechanism construction,

manpower was used to quickly finish the work of binder spurring and road paving which largely reduced the cost.

2. Short time and small-scale to closed road construction

Construction of multicolor skid-proof surface was always conveniently undertaken no matter how square it is, what time and where it is. The time for the traffic to be opened again is reduced minimum as the special binder is used to quickly pave and the work is done overnight. This is made continuously work to be true, especially in the crowded area. Oceanpower multicolor skid-proof surface is accordingly suitable to be applied to flyover maintenance, decoration of garden zone and the section of highway where is not allowed to be closed.

3. Improving the skid-resisting capability of the roadway to reduce the brake distance of 40%

Through examination of test, oceanpower multicolor skid-proof surface has the excellent property with 75-80 (European Standard Test) of the skid-resistance value. Its directly effect is to reduce the brake distance and traffic accident rate which make the advantage would be more obviously in the rain day.

4. Lowering noise, preventing water spattering

The micro-surface of the aggregate and its pores of the multicolor skid-proof surface made the noise frequency to be changed through which obviously the noise could also be reduced. Road drainage system would also be established through the macro- structure of multicolor skid-proof surface to avoid forming water-film on the road, which could effectively prevent water spattering.

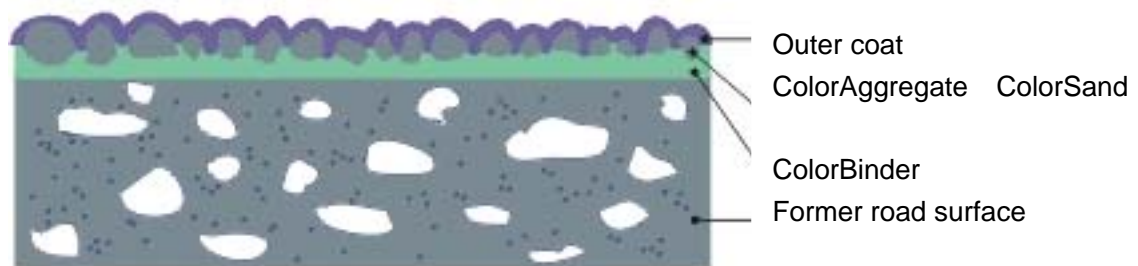
5. Light surface is suitable for the paving bridge and ferry

Every square of oceanpower multicolor skid-proof surface only has 4-6 kilos that is an ideal selection for the bridge, over-bridge and ferry ramp. The weight and height of the road would not be increased if repeated paving in a long time.

6. Convenient for the cement or asphalt road paving and easy to refurbish the old road.

The material of oceanpower multicolor skid-proof surface could be quickly and sparingly paved to the current road with a small-scale. So it is very easy to retread or refresh the pavement in the occasion of non-interrupting the traffic.

Typically cross-section



Varied color selection

1. Natural Color Aggregate
2. Synthetic Color Sand

