

Treatment of Common Technical Problems in Roof Construction

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Abstract: Roof waterproof engineering is an important part of architectural engineering, waterproof engineering quality is good or bad, a direct impact on the life of buildings and structures, affecting people's normal life order. "The Construction Engineering Quality Management Ordinance" provides for the roof waterproof engineering warranty period of 5 years, showing that the quality of roofing works is an important part of the civil housing construction. Its main role is to meet the user on the housing drainage, waterproofing, heat insulation, thermal insulation requirements. Roof cannot have leakage and water phenomenon, while the roof should also make the roof after the landscaping function. Roof construction quality is good or bad, the pros and cons are related to the life of the building. If the roof of water leakage, water seepage, people will bring a lot of inconvenience to life, not only cause serious economic losses, but also directly affect the people's normal life. So to ensure the quality of roof engineering, design is the premise, the material is the foundation, construction is the key, and maintenance management is guaranteed. Only the strict material off, well-designed, carefully construction, in order to ensure the quality of roofing works in order to give users to create a good living or working environment.

Keywords: Roof engineering waterproofing project thermal insulation project

1. The roof works and common problems outlined

(1) Overview of roofing works

Since the ancient times, roof waterproofing and insulation is a very important part of the building function. As early as the primitive society, humans knew that the cave, shelter to shelter, to the past to tile as the main waterproof material slope roof waterproof structure, and now, the emergence of the flat roof and gradually replace the slope roof to become the main roof. However, engineering practice has proved that due to the direct exposure of the structural plate in the atmosphere, the temperature difference deformation, structural deformation, concrete shrinkage and other factors to produce more board surface, but also because of the structure of

the building, cracks, not only cause serious leakage, reduce the insulation effect, and the safety of the structure of the crisis. Therefore, in order to solve this problem, we need to constantly sum up the lessons learned, and constantly improve the construction process, the construction of material quality, with scientific means to ensure the quality of roof engineering problems.

(2) Common technical problems of roofing construction

Waterproofing, thermal insulation and roofing construction works are an important part of the construction, the quality of its project quality, a direct impact on the life of buildings and structures, affecting people's normal life order.

At present, China's waterproof insulation materials, design, construction and use of maintenance and other aspects are still inadequate, the construction of the roof leakage, toilet bath leakage, basement and external wall slab and other phenomena, is still a common problem. In 1990, the Ministry of Construction conducted a survey of 2072 buildings completed in 100 large and medium-sized cities in China from 1988 to 1990, and there were 725 years. The survey was conducted in 1990, leakage problem, the leakage rate of 35%. In recent years, waterproof insulation materials such as asphalt felt, polymer membrane, sealing materials, waterproof coatings have a breakthrough, new materials continue to emerge and be promoted; building waterproof design increasingly standardized, attention to water treatment, leaving leakage of hidden dangers, has become the consensus of the designers; building waterproof construction team of professional, strict compliance with construction procedures and requirements. These factors continue to improve, greatly reducing the leakage rate of housing, and promote the construction of roof quality, technological progress.

2. Roof waterproofing works

(1) Roof waterproofing works

Building roof is a major part of the construction works, should have a waterproof, heat insulation, insulation and other functions. Roof waterproofing engineering design and construction should be from the choice of waterproof materials, construction methods and other aspects, should consider the impact of the surrounding environment and building energy efficiency to proceed, follow the 'material is the foundation, the design is the premise, the construction is the key, management is guaranteed' comprehensive management principles. General industrial and civil construction of the roof, according to their use of different materials, mainly roll backstage, coated waterproof roof, rigid waterproof roof, tile roof, insulated roof and so on. Roofing works should be based on engineering characteristics, regional natural conditions, according to the roof waterproofing level of fortification requirements, waterproof structure design, important parts should be detailed. Roofing works such as the use of a variety of waterproof materials used in combination, anti-aging and durability of waterproof material should be placed on the top.

(2) Coil waterproof roofing

Coil waterproof roof is a cemented material to paste the membrane for waterproof roof. This roof has a light weight, good waterproof performance advantages, the waterproof layer of good flexibility, can adapt to a certain degree of structural vibration and higher shrinkage deformation.

The Material requirements

Coil is also called the linoleum, is suitable for the waterproof grade roof waterproof. Membrane waterproof asphalt waterproofing materials, polymer modified asphalt waterproofing materials and synthetic polymer waterproofing materials, and other three series were used. In practice, a more ideal waterproof effect was obtained according to the roof structure and the actual requirements of different waterproofing materials or different construction methods. In the above three kinds of coils, because the original traditional petroleum asphalt membrane is difficult to adapt to the roof waterproof layer of the expansion or cracking deformation needs, so in the building roof waterproofing project, using a variety of high tensile strength, tear resistance (such as high polymer modified asphalt waterproofing materials and synthetic polymer waterproofing materials) to do the sleeper (roof) of the waterproof layer, the use of high-temperature, high-temperature performance, long life, long elasticity or elasticity of the new waterproof material, is to improve the quality of roof waterproofing works, ductile waterproof life and save the cost of maintenance of important measures.

2. Waterproof roofing construction

(1) Leveling requirements and processing

The base of the waterproof roof is a leveling layer, and more than half of it is set on the insulation layer. The leveling layer should have sufficient strength and stiffness to withstand the load without causing damage or significant deformation. Commonly used leveling layer of materials generally by the cement mortar, fine stone concrete or asphalt mortar, cement mortar should be incorporated into the crack fiber to improve the leveling layer density, waterproof layer to reduce the pin by the crack. Construction can generally be based on the lower part of the base of the different types of different materials, should be done flat, solid, clean, no convex and sharp

particles.

The construction of the waterproof roofing leveling layer should meet the following requirements.

-Should be found before leveling the sleeper (roof) slope. Roof and cornice, gutter ditch, gutter leveling layer of drainage slope, must meet the design requirements, flat roof structure should be used to find the slope should be less than 3%, the use of materials to find a good 2%, gutter, gully longitudinal slope Should be less than 1%, ditch bottom water difference is not greater than 200mm.

-In the connection with the prominent roof structure and at the corner of the basement, should be made of circular or obtuse angle, the radius of the arc should meet the requirements: asphalt waterproofing membrane for the 100 ~ 150mm, high polymer modified asphalt waterproof the membrane is 50mm and the synthetic polymer waterproofing membrane is 20mm.

-In order to prevent the temperature difference and shrinkage of concrete components leaving the waterproof roof cracking, leveling layer should be separated from the seam, seam width is generally 20mm. The seam should be left in the prefabricated plate made into patchwork, the vertical and horizontal maximum spacing, when leveling layer with cement mortar or fine stone concrete, not more than 6m; the use of asphalt mortar, it should not be greater than 4m. Sub-grid joints should be attached to 200 ~ 300mm wide linoleum, with asphalt cementation material single-sided paste cover.

-Leveling layer surface should be smooth, uniform. The flatness is: 2m long inspection ruler and wedge-shaped ruler check, leveling surface and the detection of the maximum gap between the rulers should not exceed 5mm, and the gap is only allowed to change gently, plum 1m length shall not be more than one.

-Cement mortar, fine stone concrete leveling layer shall not have crisp pine, from the sand, from the skin phenomenon; asphalt mortar leveling layer shall not have uneven mixing, honeycomb phenomenon. Before the construction of the waterproof layer, must be the surface of the cement layer of cement mortar and other objects, dust debris and other clean, the best cleaning in the high-pressure hair dryer after cleaning, such as cleaning process found rust, oil, etc., must use wire brush , sand-

paper or organic solvent to be removed.

(2) Waterproofing membrane construction

Asphalt waterproofing membrane construction. Asphalt waterproofing membrane refers to the use of base paper, fiber mats and other carcass impregnated asphalt material, the surface of the powder, granular or sheet material made of curled sheet waterproof material.

The general process of the construction of the waterproof layer of the membrane is: the primary treatment spray, the coating treatment agent → the additional treatment of the joints → the positioning, the elastic line, the trial shop → the paving sheet → the finishing processing → the node seal → check → laying protective layer.

-Laying direction. The laying direction of the web should be determined by whether the roof slope and the roof are vibrated. When the roof slope is less than 3%, the coil should be parallel to the roof paving; roof slope between 3% to 15%, the coil can be parallel or perpendicular to the roof paving; roof slope greater than 15% or roof vibration , Asphalt waterproofing membrane should be perpendicular to the roof paving. The upper and lower layers may not be piled on each other.

-Construction sequence. Roof waterproofing layer construction, should be done first node, additional layer and roof drainage more concentrated parts of the treatment, and then by the roof of the highest elevation of the upward construction. High and low span Siamese roof, should first pave the high cross and then paving low cross, paving should be from the bottom of the standard elevation to the high elevation of the direction of rolling, oil should be rolling along the linoleum into a serpentine operation, paving staff with both hands pressed felting roll forward roll laying, the application of uniform force to squeeze out the oil, sticky, there is no air for the degree, and squeeze out along the side of the oil scraped to flat degrees; paste material thickness should be 1 ~ 1.2mm.

Paving gutter, gutters roll, appropriate along the roof gutter, cornice direction, try to reduce the lap. Large area roof construction, should be based on roof characteristics and size and other factors reasonable division of water supply section, the construction section of the boundaries should be located in the roof, gutter, deformation joints

and so on.

-Lap method and width requirements. Paving the use of coiling method, the upper and lower layers and adjacent two webs of the joints should be staggered. Parallel to the boundless street should be along the water direction, perpendicular to the boundless street should lead the wind direction. Laying the layers of the membrane, and then the gutter and the roof of the connection, should be used to fork connection lap, lap joints should be staggered, joints should stay in the roof or gutter side, should not stay in the ditch at the end.

-Paving method. Asphalt film paving methods are fueling method, brush oil method, scraping oil method, sprinkling oil and other four kinds. Oil method is the asphalt glue poured on the base layer, and then push the roll forward to roll the membrane and the base paste; brush oil method is to brush with the brush to the base layer, brush oil length of 300 ~ 500mm of the rubber scraper scraping asphalt glue paving; sprinkling method is in the first layer of the membrane, the film is now coated with asphalt around the middle of the way with the snake-like shower spread shop, the remaining layers are still According to the fuel, brush oil, pipe with a method of paving, this method is not used for the grass-roots drying is not dry to do the situation. With a coiled material after the paste in the surface layer of a layer of 2 ~ 4mm thick asphalt glue, sprinkled with a layer of particle size of 3 ~ 5mm small bean, and to be compacted, so that the bean and Asphalt glue bonded firmly, is the majority of self-embedded asphalt glue in the formation of protective layer. Unbonded bean curd is cleaned in a timely manner.

(3) The structure of the waterproof roof

Gutter, cornice, gutter ditch, flood, deformation of the waterproof structure, must meet the design requirements. Gutter, cornice, gutters, floods and inside the end of the coil should be cut into the end, into the reserved groove, with metal pressure, nail pressure fixed, the maximum stitch should not be greater than 900mm, and with a sealing material Inclined seal, groove from the roof leveling layer is not less than 250mm, the upper wall of the groove should be waterproof.

(4) Coated waterproof roofing

Apply a waterproof roof is painted on the basis of the roof waterproof coating, after curing to form a layer of a certain thickness and elasticity of the overall coating to achieve the purpose of waterproofing a waterproof roof form. It is used for a variety of concrete sleepless waterproof; its use in the construction of reinforced concrete construction is more common. This roof has the characteristics of simple operation, no pollution, cold operation, no seams, able to adapt to the complex base, waterproof performance, and temperature adaptability. Applicable to waterproof grade III, VI level of roof waterproofing, but also as a class I, II level multi-channel waterproofing in a waterproof layer.

1 Coating waterproofing layer construction

The general process of waterproofing the coating is: the surface of the basement cleaning, repair → spraying the primary treatment agent → special parts additional enhanced treatment → coating waterproof coating and paving carcass reinforcement material → cleaning and inspection repair → protective layer construction.

Coating waterproofing must have two layers above the composition of the composition, the coal (each) should be brush 2 to 3 times, and according to the waterproof varieties, cover the coating, cannot be coated once, and the first coating to dry Film thickness, can be painted again after the paint, seven thick bottom must meet the design requirements.

(5) Rigid waterproof roofing

With a rigid waterproof material to do the waterproof layer of the roof, said rigid waterproof roof, mainly fine stone concrete, compensatory shrinkage of concrete, and steel fiber reinforced concrete waterproof roof. Rigid waterproof roofing is not covered with loose insulation roofs, large span and light roof roofs, and roofs with larger vibrations or shocks. Rigid roof is mainly used for waterproof grade III grade roof waterproofing, can also be used as I, II level multi-channel waterproofing in a waterproof layer.

1. Material requirements

Waterproof layer of fine stone concrete is suitable for ordinary Portland cement or Portland cement, the strength level should not be less than 32.5, shall not use volcanic

ash cement. Coarse aggregate maximum particle size should not exceed 15mm, mud content should not be greater than 1%; fine aggregate should be used in sand or coarse sand, mud content should not be greater than 2%. Concrete ash ratio should not be greater than 0.55%, the minimum amount of concrete per cubic meter of concrete should not be less than 330kg, sand rate should be 35% to 40%, sand / sand ratio should be 1: (2 ~ 2.5), and should be incorporated Admixture; concrete strength shall not be lower than C20. Ordinary fine stone concrete compensated shrinkage concrete free expansion rate should be 0.05% to 0.1%.

2. Isolation construction

Rigid waterproof roof between the base layer and the waterproof layer to do isolation layer. So that the grass-roots structure layer and the deformation of the waterproof layer is not bound to prevent the tensile stress generated by concrete cracks caused by leakage.

The isolation layer to continue construction, we should pay attention to the protection of the isolation layer. Concrete transport cannot be carried out directly on the surface of the isolation layer, should take the pad and other measures; help bar bars cannot be punctured when the surface, pouring concrete cannot sparse isolation layer.

3. Set the sub-grid seam

Rigid waterproof layer should be set sub-grid joints. In order to prevent a large area of rigid waterproof layer due to temperature, concrete shrinkage and other cracks should be set according to the design requirements sub-grid seam. Vertical and horizontal sub-grid is generally not more than 6m, sub-grid area of not more than 36 square meters, sub-grid seam embedded seal material, sub-grid width of 5 ~ 30mm, the upper part of the protective layer. Sub-grid seam is the general practice is in the rigid waterproof layer before the first set in the isolation layer of sub-grid seam position, in the placement of partition, and then by pouring concrete block, until the concrete initial condensate, the grid will be removed The Sub-grid joints can be embedded in the sealing material and paste the way to deal with waterproof membrane to increase the reliability of waterproof.

4. Waterproof construction

Concrete pouring should be preceded by the first, the first high to low after the principle of a sub-grid of concrete must be a pouring finished, not to leave the construction joints. Fine stone concrete protective layer thickness of not less than 40mm, should be equipped with two-way steel mesh, spacing 100 ~ 200mm, but should be broken at the separation joints, steel mesh should be placed in the upper part of the concrete, the protective layer thickness of not less than 10mm. Concrete pouring, first with a fl at vibrator vibration, and then roll to the surface of the roller roll, pan, and then use the iron trowel compaction smoothing, and to ensure that the waterproof layer design thickness and drainage slope. It is forbidden to sprinkle water on the surface, add mud or sprinkle cement. To be concrete initial condensate water, the secondary surface should be calendaring, or three times in the final condensing pressure to survive, to improve the impermeability. Concrete pouring 12 ~ 24h should be carried out after curing. Curing time should not be less than 14d. Maintenance Department from the roof cannot be superior. Construction temperature should be 5 ~ 35 °C, to ensure the construction quality of waterproof layer.

3. The roof insulation works

(A) General roof insulation

The following are the same as the

Ordinary insulation works are usually loose material insulation layer, plate-like material insulation layer and the overall three kinds of real-time insulation layer.

Loose material insulation layer for flat roof, does not apply to a larger vibration or vulnerable to the impact of the roof. Plate-like material insulation layer is for a certain slope of the roof. As a result of pre-processing prefabricated, the general moisture content is low, so not only the insulation effect is good, but also the impact of the quality of flexible waterproof layer is small, is used for the overall closed insulation layer. The integral cast-in-place insulation layer is suitable for flat roofs or smaller roofs. This kind of insulation layer is mixed in the field, so enhance the wet work on the site, the insulation layer of water content, can lead to the membrane waterproof layer from the drum. It is generally used in non-closed insulation layer. If used for the overall insulation layer, you should

take the exhaust roof measures.

1. Sheet material insulation layer

-material requirements

Commonly used materials are cemented vermiculite slabs, cement expanded perlite slabs, asphalt swell vermiculite slabs, asphalt expanded perlite slabs, aerated concrete slabs, foam concrete slabs, mineral wool, rock wool board, polystyrene board, polyvinyl chloride foam plate, polyurethane foam board and so on.

-insulation layer construction

Laying the floor of the insulation material should be smooth, clean and dry. Plate insulation materials to prevent rain damp, in the handling and storage should be gently, to prevent damage to the fracture, missing edge angle, to ensure the integrity of the board shape. Paving method is divided into two kinds of dry and paste method.

2 Integral real-time insulation layer

-material requirements

Generally the overall real-time insulation layer for the cement expansion of vermiculite and cement expanded perlite, for some small roof or winter construction, can also be used asphalt expansion of vermiculite or asphalt expanded perlite. In addition to small towns and rural buildings, cement slag and cement lime slag can also be used. Which asphalt cement material should choose 10 asphalt or meet the requirements of the emulsified asphalt; cement strength level should not be less than 32.5.

-insulation layer construction

When the whole cast-in-place insulation layer is laid, the laying thickness should meet the design requirements, the surface should be flat and meet the required strength; but it cannot be too compact to avoid the insulation effect.

(B) Inverted roof insulation

Inverted roof insulation is characterized by the hydrophobic insulation material set on the waterproof layer above the waterproof layer to play a protective role and shielding effect, so that it is not affected by the impact of

climate change and climate change, but also vulnerable to mechanical damage from the outside. Generally with polystyrene foam and other high thermal insulation coefficient, low water absorption material insulation layer, and the insulation layer is set on the main waterproof layer. With energy-saving insulation, to extend the life of the waterproof layer, construction convenience, high labor efficiency, comprehensive cost of economic advantages.

1 Main performance analysis

Inverted roof has the advantages of improving the indoor environment, improving the quality of living and reducing the roof load, saving energy and so on. In recent years, the application has become more and more widely.

1. improve the durability of the waterproof layer
2. to prevent condensation inside the roof structure
3. waterproof layer is not easy to be damaged
-improve the indoor microclimate environment

2 Construction requirements

(1) Inverted roof should use the apparent density is small, low moisture content, thermal conductivity and steam permeability coefficient are small, and has a certain strength of the plate-like insulation material, is currently recognized

as a better polystyrene foam board; can be used asphalt expanded perlite. In addition, the insulation layer after damp heat conductivity increases, so the design of insulation material thickness, should be calculated than the thickness of 20% to 30%.

Inverted roof waterproof layer should use polyester mattress base of the polymer modified asphalt waterproofing membrane, usually double. SBS modified asphalt waterproofing membrane can also be used as the bottom layer, and III type SBS modified asphalt waterproofing membrane made of composite waterproof layer.

Protective layer, should use the steam permeability coefficient of large material, so that after the rain in the insulation layer of water quickly evaporated. Therefore, in the non-human roof, the choice of pebbles to do the protective layer is the most appropriate. It has a good internal breathing effect, this time the thickness of the

protective layer should be equal to the thickness of the insulation layer, and should not be less than 60mm; and in the man on the roof, you can use 30mm thick prefabricated concrete slab or 50mm thick GRT light board, 500mm × 500mm size block, the seam can be filled with cement mortar, do not have to use sealing material caulking, to facilitate the evaporation of moisture.

Master roof insulation layer should be used paste method; not on the roof can be pasted or not paste the method.

Protective layer for the concrete slab or GRC light board, the use of cement mortar paved; protective layer for the pebbles, pebbles and insulation layer should be placed between a layer of puncture resistance and durability and corrosion resistance of the fabric.

1. Winter construction

(A) Winter construction characteristics and basic requirements

With the development of China's construction industry, the construction of the Mainland is also increasing, especially in the three north (northwest, northwest and north China) areas. With the development of various resources, it is necessary to speed up the construction progress in industrial and civil construction projects. So that the project put into operation early, give full play to its economic benefits of the project more and more. Which in the vast areas of the north, winter construction tasks are gradually increased.

China's northern region, winter construction period is generally 3-6 months, the proportion of high proportion of the project up to 30%. As the winter construction has its special and complex, coupled with the uneven construction of our construction team technical level, according to years of experience, in this season for construction, but also the quality of the project prone to the season. Therefore, the selection of construction methods to determine a better quality assurance measures, is to ensure the quality of the project to speed up the progress of the project, and reduce the key to resource consumption.

General requirements for winter construction

1) Winter roof waterproofing construction should choose no wind and sunny weather, and should be based on the use of waterproof materials to control the construction temperature limits, and the use of sunshine

conditions to improve the surface temperature. In the windside should set the activities of the wind device.

-Roof leveling layer should meet the following requirements:

-leveling layer should be solid and solid, no convex surface, from the sand, from the drum phenomenon. If snow, residual frost, debris, etc. should be cleaned.

-laying layers before the steam layer and waterproof layer, leveling layer should be kept clean and dry.

-the connection between the leveling wall and the wall, the wall, the skylight wall, the deformed seam, the chimney, etc., and the corner of the leveling layer (waterfall, cornice, gutter, gutters, roof, etc.). When the use of asphalt waterproof membrane radius of the radius should be 100-150mm; high polymer modified asphalt waterproofing membrane, the radius of the radius should be 50mm; synthetic polymer waterproofing membrane should be 20mm.

-roof waterproof construction, should first do a better level of drainage areas. Where the site should be additional layer of additional layer.

- in the construction of pay where the operation, should be reasonable arrangements for the steam layer, insulation layer, leveling layer, waterproof layer of the process, and should be continuous operation. On the completed parts should be timely coverage, to prevent moisture, frozen. Piping equipment or embedded parts that pass through the roof waterproofing layer shall be installed and waterproofed before the waterproof construction.

After the completion of the roof waterproofing layer, shall not be chiseled on the hole, as well as stacking equipment or sharp objects, etc., and should be the country's current standard 'roofing engineering technical specifications' (GB50345-2004) requirements for acceptance.

- plate-like insulation material quality

Appearance quality: the shape of the board should be neat, the thickness of the allowable deviation of ±5%, and not more than 4mm.

-foam: apparent conspiracy for the 30-130kg / m³, thermal conductivity of 0.04-0.05W / k, compressive strength ≥ 0.1 Mpa.

-microporous concrete, the performance plot for the 500-700 kg / m³, thermal conductivity of 0.19-0.22 W / m · k, compressive strength ≥ 0.4 Mpa.

-expansion of vermiculite, expanded perlite products: apparent density of 300-800kg / m³, thermal conductivity of 0.1-0.26W / m · K, compressive strength of 0.3Mpa.

(2) insulation materials into the inspection project

- loose insulation material should check the particle size, pile density.

-plate insulation material should check the apparent density, thickness, plate shape and compressive strength. -insulation material storage and transportation, storage should pay attention.

2.2. insulation material storage and transportation process, must be carried out rain, moisture treatment, and should be classified stacking to prevent the mixed.

2.3. plate insulation material in the handling should be gently, to avoid damage to the fracture, missing edge angle, to ensure the integrity of the board shape.

(C) Leveling layer construction

1 Material requirements

(1) winter construction of cement mortar should be mixed with antifreeze additives (such as chloride, NC composite early strength agent, MS-F composite early strength water-reducing agent, etc.), the amount of cement is generally the amount of 2% -5%. Construction, the first cement and sand dry mix evenly, and then add antifreeze admixture of aqueous solution, and control the consistency of mortar in the 6-9cm, before construction.

(2) mixing cement mortar, should be carried out in the greenhouse, mixing mortar temperature should be able to meet the construction requirements.

-in order to reduce the loss of mortar heat, storage and mortar containers can take insulation measures.

- cement mortar leveling layer smoothing pressure, the day should cover the black plastic sheet for conservation, at night and then covered with straw curtains for

insulation conservation.

-winter construction of fine stone concrete should be mixed with micro-expansion agent and antifreeze admixture, mixed with concrete and sand should be heat treatment, water temperature control of the same as the following table. The curing of concrete is the same as that of cement mortar.

3.4. asphalt mortar by 60, a 60, B Road, asphalt or 75 ordinary oil asphalt and sand in the preparation of sand and powder. The mix ratio is asphalt: sand and powder = 1: 8 to 1:10 (weight ratio), where the sand powder ratio is 3: 1.

3.5. the asphalt into the pot melting and dehydration, brewing temperature should not exceed 240 °C; sand and powder in proportion, preheat drying (temperature of 110 to 120 °C). The melted asphalt and preheated sand, powder in proportion to pour in the mixing plate in the heating and mixing, mixing temperature of 190 to 210 °C is appropriate.

3.6. paving asphalt mortar of the grass-roots requirements of dry, clean, and brushing 1 to 2 times cold base oil, to be cold after the oil drying can be layered according to the requirements, sub-paving asphalt mortar, rolling fl at, its thickness should be Uniform, and meet the design requirements.

3.7. Asphalt mortar should be set sub-grid seam, sub-grid vertical and horizontal spacing of not more than 4m, seam width to 20mm or so is appropriate, sub-grid should be located in the support side and the end of the board, sub-grid should be embedded in the seal material closed.

-When the completion of a section of asphalt mortar should be paved waterproof layer, or use plastic film or sheet cover to avoid rain, snow immersion.

2 Operation process

(1) cement mortar leveling layer,

-winter construction of cement mortar should be in accordance with the temperature and curing temperature requirements doped with anti-ice additives (such as chloride, NC composite early strength agent, MS-F composite early strength water-reducing agent, etc.), the amount of cement is generally the amount of 2 % -5%. Construction,

the first cement and sand dry mix evenly, and then add antifreeze admixture of aqueous solution, and control the consistency of mortar in the 60-90mm, before construction.

4.1. When using sodium chloride antifreeze, should use ordinary Portland cement or slag Portland cement, mortar strength should not be less than 3.5N / MM², the construction temperature should not be less than -7.

4.2. mixing cement mortar, it should be carried out in the greenhouse, mixing mortar temperature should be able to meet the construction requirements.

The minimum temperature above -10, the plaster when the mortar temperature should be 5; the minimum temperature in this 10 to -20 , the plaster when the mortar temperature should be 15.

Mix the temperature of the cement mortar should be heated to 60, if the mortar is still less than the requirements when the sand, the sand should be heat treatment.

- leveling layer should be set to separate points, seam width should be 20mm, and embedded seal material. When the partition sewn as the exhaust roof of the exhaust channel, may be appropriate to widen and should be connected with the insulation layer. The septum should be left at the plate end, the maximum spacing between the vertical and horizontal use of cement mortar is not greater than 6m.

5. Fine stone concrete leveling layer of winter construction of fine stone concrete should be mixed with expansion agent and antifreeze admixture, mixed with concrete and sand should be heat treatment, watering concrete temperature control and cement mortar leveling layer the same.

6. Asphalt mortar leveling layer

- asphalt mortar by the 60, A, 60 B Road, asphalt or 75 ordinary oil asphalt and sand and powder from the preparation. The mix ratio is asphalt: sand and powder = 1: 8 to 1:10 (weight ratio), where the sand powder ratio is 3: 1.

- the asphalt into the pot melting dehydration, brewing temperature should not exceed 240; sand and powder in proportion, preheat drying (temperature 110 to 120). The melted asphalt and preheated sand, powder in proportion to pour in the mixing plate in the heating and mixing, mixing temperature of 190 to 21 is appropriate.

-Paving asphalt mortar of the grass-roots requirements

of clean, dry, dry the whole, no ice and snow, debris, and brushing 1-2 times cold base oil, to be cold after the oil can be dried according to the requirements of layered paving Asphalt mortar, rolling flat finishing, the thickness should be uniform, and meet the design requirements.

- Asphalt mortar should be left sub-grid joints, sub-grid vertical and horizontal spacing should not be greater than 4m, seam width to 20mm or so is appropriate, sub-grid should be located in the support of the end and according to the needs and board joints, Fill the sealing material. When the sub-grid sewn as the exhaust roof of the exhaust channel, may be appropriate to widen and should be connected with the insulation layer.

- When the completion of a section of asphalt mortar, should be timely paving waterproof layer, covered with plastic film or sheet, to prevent rain, snow immersion.

- Asphalt mortar laying construction should be taken to sub-flow operations and insulation measures, laying thickness should not be less than 15m (gutter, roof protrusion of the root 50mm within not less than 25mm), virtual shop mortar thickness should be the actual thickness of 1.3 to 1.4 times.

(D) rigid roof waterproof roof construction

1 Material requirements

- fine stone concrete is not allowed to use volcanic ash cement; when the use of slag Portland cement, should be taken to reduce the bleeding measures. Coarse aggregate mud content should not be greater than 1%, fine aggregate mud content should not be greater than 2%.

- concrete water-cement ratio should not be greater than 0.55, the amount of concrete per 1m³ cement shall not be less than 330kg, sand rate should be 35% to 40%, gray sand ratio should be 1: 2 to 1: 2.5, concrete strength level should not be low At C20.

- addition of admixtures in concrete should be qualified to do, and do on-site re-test before use. Admixture according to the ratio of accurate measurement, feeding order properly, and should use mechanical mixing, mechanical vibrator. sand should be used in sand (particle size 0.35 to 0.5mm), does not allow containing debris, mud content of not

more than 1%, sulfide and sulfate content of not more than 1%.

- water should be used without the harmful substances of clean water, general tap water and drinking water can be used.

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