

Asphalt

Name

Institution

Asphalt

When one thinks of asphalt, one conjures up black, tar-like substance that hardens into a road or parking lot surface. That image is correct. Asphalt is used to build roads and parking lots and for other construction purposes. Its industrial name is bitumen, a hard substance composed of a mixture of hydrocarbon mixtures. It is dark or black in color and is exceptionally sticky. Because of its gluey characteristics, it is used for binding purposes on surfaces such as roads or for providing protection for roofs from rain and other outside weather conditions. It comes in both a natural form called crude bitumen and the refined form, which is extracted from crude oil through a process of fractional distillation. The natural form is comprised of a number of elements, including sulfur, mercury, and lead. Asphalt is not a modern invention. Rather, it has been around for centuries as one of the best known materials used in engineering projects. Even the ancient Egyptians used asphalt for water-proofing purposes (Asphalt Cement, 2012). Uses by early civilizations included providing pavement in temples, on reservoirs, and in building highways.

The production of asphalt involves the processing of crude petroleum, which is from where not only asphalt comes but also other products such as gasoline, kerosene, and paraffin. The crude petroleum is removed from oil fields where it is then delivered to oil refineries. It goes through a set of procedures for separating the various substances into products. After the distillation processing has been completed, the asphalt remains as a residue because of its heaviness.

First, the petroleum crude enters into a crude exchanger where the process of distillation begins with a heating process. From there, the substance enters into an atmospheric distillation tower. Some of the elements within the crude are then distilled through a vaporization process

and are further collected and contained in coolers. This includes gasoline. Afterwards, heavier components such as kerosene are condensed, followed by diesel, which is even heavier. What is left from the process is topped crude, which can be used as fuel oil or further processed to develop into asphalt (Asphalt Cement, 2012). At this point, the next step in the process, vacuum distillation, will develop the resulting asphalt into what is called “straight run asphalt.” This is done for safety reason in case the topped crude developed contains any components that can be considered volatile in nature.

The pure asphalt is not readily usable, and so its temperature is lowered and softened through a process of blending (Asphalt Cement, 2012). The product, referred to as cut back product, added to the pure asphalt evaporates due to air exposure, resulting in hardened cement. The residual asphaltic oil left over from the former processing methods is then mixed with current process to produce either slow-curing asphalt or medium-curing asphalt, the latter produced with a mixture of kerosene. It can also yield fast-curing asphalt if mixed with gasoline. As indicated, how quickly the asphalt cures is dependent upon the element with which it is mixed.

Because asphalt is such a sticky substance, to develop it into cement that can more easily be poured, it undergoes a process of combining it with another substance. First, the cement is ground into small chunks. Then, water and a chemical are added to the cement to make it flow more easily. The chemical or agent added needs to be something to keep the water and the asphalt from separating. Such agents are found in other products such as soap and vegetable oil. If a smaller component of the asphalt is needed, such as in a powdered form, the asphalt is crushed and then passed through a strainer to ensure that the granules are of a small, uniformed size. It is this power-like asphalt that is combined with other components such as road oil and

used for paving roads and other surfaces like parking lots or driveways. Oxidized asphalt, in contrast, is used for roofing material or pipe coating. It calls for creating an asphalt product that is pliable at a higher temperature. It is produced at a processing plant that allows for the asphalt to be heated at 260 degree Celsius and air blown for between one and four hour periods. Once the oxidized asphalt has cooled, it remains liquid (Asphalt, Paving & Construction, 2012). In reference to the temperature levels of the asphalt mixtures, the hot mix is appropriate for roads and other driving surfaces that endure heavy traffic, whereas the cooler mix, referred to as cold mix, is more appropriate for maintaining surfaces and is used for secondary roads. Hot mix asphalt is produced in two kinds of processing plants, the batch plant and the drum mix plant (Paul, Puspa-Dewi, Lueprasert & Madon, n.d).

In summary, asphalt has a number of purposes in construction, such as in providing road surfaces and waterproofing roofs and in coating pipes. It can be found as a natural byproduct of crude oil deposits, and it can be processed into a more refined product. It can be extracted in a manner that allows the vaporization of paraffin and gasoline, as well as other volatile substances, remaining as a residue due to its heaviness. A process of oxidation allows it to be crushed into a powdery substance and can, with the addition of water and a solvent, be used for a variety of purposes. Finally, it can be developed into either a hot mix or a cold mix for various purposes.

References

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