

TECH TALK

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ASPHALT

Part 2

We have seen how asphalt is made and laid and also looked at the different types that can be produced depending on the kind of stones (inert) and bitumen (binders) that are chosen. Different asphalts are selected according to the use they will be put to, for example as racing tracks, roads or highways.

Characteristics of asphalts

Draining asphalts are a great solution for highways where high speeds and water, especially puddles, do not mix. Aquaplaning is reduced and visibility is improved with draining asphalt. Such asphalt is limited though in that it is less compact compared to traditional asphalts and it also has less resistance to wear. In fact, draining asphalts are called 'open mixture' asphalts because the empty spaces inside of them are equal to around 20% of the entire volume, while traditional 'closed mixtures' have this percentage equal to or less than 8% and have a better mechanical resistance. Draining asphalt was used once in the '80s on the Formula 1 track in Belgium, at Spa Francorchamps. The result was a real disaster, the track did not support the vertical and lateral forces of the racing cars and the Grand Prix was cancelled that year.

Another problem with draining asphalts is that they are not just permeable to water but also greatly to air, meaning the positive effect in wet track conditions becomes a negative one when ground effect is a factor so grip is

greatly reduced for single-seaters.

A good compromise is to produce an asphalt with a rough surface for good grip and good water drainage as the water will pass through the channels present between the peaks of the surface. Asphalts with completely smooth surfaces are no longer made but of course very rough surfaces generate high tyre wear and weaknesses of the peaks on the surface of the asphalt. To avoid this, binders with extremely high mechanical strength are used, such as bitumen with polymers.

To measure the roughness of asphalt a particular procedure is followed. A given amount of sand is distributed on a circular area on the asphalt. The rougher the surface the more the sand will deposit inside the asphalt and the smaller the circular area will be. The radius of the area is measured and the greater the radius the smoother the asphalt.

Racing circuits and roads

We might think that laying and compacting asphalt on a race track is easier than on a road or highway since we have more time and no traffic passing on the track. This is not actually true. For starters a race track must near perfect with no bumps at all! Also, traffic and dirt on the asphalt actually help compacting. When heavy cars or trucks drive along a road they press vertically down on the asphalt, while dirt helps prevent new asphalt from sticking to tyres and being lifted and torn away. Race tracks on the other hand are usually extremely clean with no dust or dirt and are also quickly cleaned by the extremely soft rubber of racing cars' tyres. Downward forces on the asphalt are not so strong since racing cars are not very heavy so compacting of the asphalt does not really occur. Transversal-horizontal forces are on the other hand very high since the grip of the tyres is so high. This causes the asphalt to

tear sideways as well as rapid surface wear.

Following these criteria, karts are really the most destructive vehicles for tracks. The combined weight of chassis, engine and driver is extremely small but lateral grip is extremely high and the soft sticky rubber of the tyres pulls off bits and pieces of the surface. Asphalt on corners is often torn away when new and worn quickly if the choice of the binder is not right and the compacting phase is not completed properly. Motorbikes badly wear the asphalt surface since they are not heavy but have a narrow area of contact between the tyres and the track surface. Once the asphalt starts to deteriorate the only solution is resurfacing. A partial solution often used at kart tracks is to apply special resins that harden over night to the worn areas, however these are very expensive. You can recognize them because they are white coloured. They are also particularly smooth but still have good grip characteristics.

Seasons and settling

One of the main problems in renewing a track surface is that work lasts quite a long time and the track has to close for a period losing money. Weather conditions such as rain, sun, temperature and humidity must be considered for good results and compacting and can also increase or reduce the duration of the work.

It is best to avoid the coldest seasons when the low temperatures make it difficult to work the asphalt at the right temperature (asphalt cools down quickly when transported or laid). Humidity acts negatively on the bitumen reducing the binding effect. After laying and compacting, asphalt should be left to rest for around 10 days. To increase the compacting effect, heavy vehicles can be driven over the track after limestone sand has been spread over the surface to reduce its sticking characteristics.



The World Championships at Braga in 2000 were almost cancelled when the circuit broke up badly in practice. The track had been resurfaced but the job had only been completed one week prior to the event. Emergency repairs were carried out on the Thursday evening enabling the meeting to go ahead

Photos: Giovanni Paterlini