GREENWAYS SURFACING:

Challenge preconceived notions for an eco-friendly choice

FRANCE NATURE ENVIRONNEMENT

AF3V
Pour les véloroutes et voies vertes

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EDITORIAL

Walking, cycling, rolling, wheeling, roller-skating, traveling with a pushchair, a child's scooter, alone, in a group, with family, this is what our greenways allow, or rather, this is what they should allow. This is not always the case, however, as their surfaces do not have the required quality everywhere. The surface is the key: from self-binding, bound or compacted gravel to various types of concrete (asphalt, bituminous, hydraulic), there is no shortage of names. One of the goals of this booklet is to help you better understand the different types of surfacing.

Cyclists, like all users of greenways, want comfort, safety and accessibility. Developers and elected representatives want durable facilities at reasonable prices. For the AF3V, all these demands must be reconciled: comfort of use, accessibility for all users, respect for the environment and adaptation to climate change. They are not irreconcilable.

But for that, we must remove many misunderstandings, challenge many preconceived notions, intuitions that are not always relevant. This is another goal of this booklet.

And to remove these misunderstandings, we propose, with our friends from France Nature Environnement, the results of our assessments of the effects on the environment, health, biodiversity of the different types of surfacing, as well as their effects on their use. Without forgetting, of course, their indispensable financial evaluation.

Our shared desire is for our fellow citizens to have more sustainable, better quality and more inclusive facilities. Because well-designed greenways, linked to a larger network, integrated with local cycle routes and discovery tours, can be a tremendous lever to enhance a territory and showcase its tourist heritage in the broadest sense. Finally, a coherent and attractive network of greenways is a tool that contributes to the ecological transition, and even modestly, to the collective effort to combat global warming.

Pierre Hémon
President of AF3V (French association for
the development of cycle routes and greenways)

AF3V
Pour les véloroutes et voies vertes

SURFACING GUIDE FOR GREENWAYS

EDITORIAL

The statistics are clear: half of working people drive their car every day for a commute of less than 2 km. They use a vehicle weighing a ton and a half, mostly powered by fossil fuel, to cover a distance that a cyclist can easily cover in 10 minutes and a person on foot in half an hour. And it's not just the health of the planet that's at stake, it's ours too: the lack of physical activity and connection to the natural world has become a major public health issue for all generations.

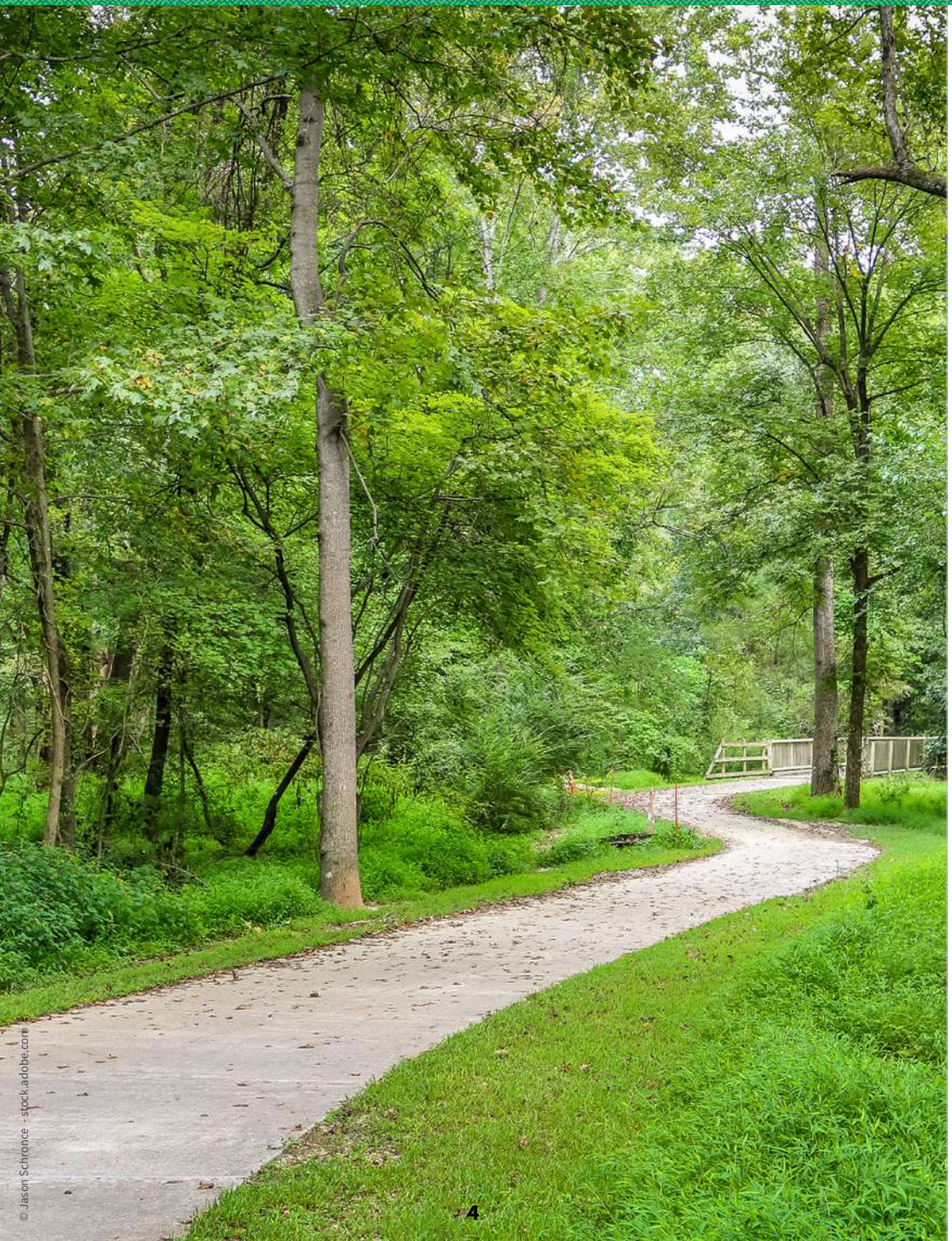
How can we fix it? The solution is well known: we need to give more space to soft and active mobility. The message is beginning to be heard in the big cities, but the challenge remains in the suburbs and rural areas. Greenways are essential to facilitate connections between neighbourhoods, between hamlets and village centres: they are intended to welcome cyclists, people with reduced mobility, pedestrians, parents with pushchairs, children on scooters, etc. for both utilitarian and leisure trips. While the uses may be different, the need for a rolling, smooth, even surface is the same.

The associations for the protection of nature and the environment federated within FNE gather many cyclists, walkers and hikers, rallied or not in associations. What better way to admire the fauna and flora than to approach it without the noise of a combustion engine? Greenways offer an opportunity for a peaceful reconnection between humans and nature. Let's encourage their development by thinking about their design and location in terms of preserving the climate and biodiversity, while at the same time enabling us to reconnect with living things.

Let's make greenways collective projects that contribute to building a livable world.

Antoine Gatet
President of FNE (France Nature Environment)

FRANCE NATURE ENVIRONNEMENT



INTRODUCTION

Increasing the share of active modes in daily mobility is a major challenge for the ecological transition. Although the 9% modal share for cycling planned for 2024 is far from being achieved (barely 4% to date), the target set by the Cycling Plan and confirmed by the National Low Carbon Strategy for 2030 is still 12%. It is therefore imperative to develop the quantity and quality of cycling facilities in all our territories, in and outside urban areas.

Despite their exorbitant cost for society, users and environment, motorways are popular with motorists because they are a continuous, fast, comfortable and safe network. Why not reasoning the same for cycling facilities? Users should be offered a high level of quality on greenways with direct, continuous, comfortable, secured routes, enabling each of them to go at their own pace. High speed for utility trips (commuting, shopping...) or long-distance trips, slower speed for leisure (walking, visiting, hiking...).

During a long time, gravel surfacing matched with the green image of cycling. Due to its natural look, gravel surfacing melted harmoniously into the background. It looked as if it was part of the natural environment and caused no pollution. On the contrary, an asphalt greenway was perceived as a road with all its negative features: polluting, ugly and consuming natural areas.

But now, experience feedback, studies and improvement of products used fight against popular belief. Despite appearances, the environmental performance of “asphalt” greenways is better than the “gravel” greenways one. An asphalt surface is far more efficient for users than a gravel surface, considering security, comfort and durability. Asphalt has a lower impact on the environment and its integration into the landscape is not a problem once light aggregates and transparent binders are used.

Greenways surfacing: what are we talking about?

Selecting the surface of greenways can be controversial due to statements based on popular belief. These days we have reliable eco-comparative standards and significant experience feedback.

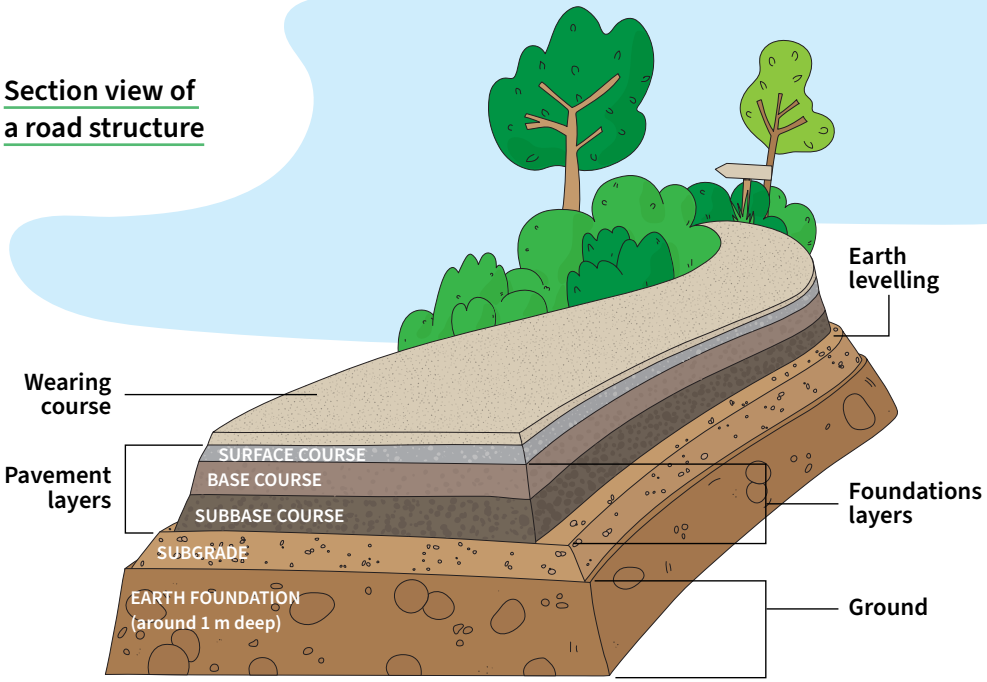
Greenways are mainly created upon existing infrastructures: disused railways, towpaths, country lanes or woodland paths... But building a road infrastructure from scratch is most damaging for soils, biodiversity and landscape. To build one, you must clear and strip the topsoil first and then level and compact the soil to create the ground support. On this groundwork, several courses will be layered: a subbase course made of aggregates, gathered together thanks to a base course, and then the surface course, also known as wearing course. During these different phases, heavy and bulky construction machines need large spaces to move, and not only on the road under construction.

Canigou mountain from Agly river between Torreilles and Le Barcarès

To develop the greenways network, it is thus best to re-use numerous existing infrastructures rather than to create new ones. As foundations exist, damage to the environment and biotope are avoided. In this booklet, we will only consider components and requirements for the surface course of the road structure.

Two main categories of surfacing can be used for light and environmentally-friendly non-motorised modes: gravel and concrete.

Section view of a road structure



GRAVEL

In this product category, we find mechanically compacted self-binding gravel and bound gravel.

The first one (compacted gravel) must be avoided! The poor quality of this material does not meet the requirements of greenways and their multimodality; it is not suitable for wheelchairs, pushchairs, rollers...
The main drawbacks are:
• low permeability (due to natural settling and compacting) and distortion, which lead to rutting and ponding as more and more cyclists use the path,
• powder aspect, with dust being propelled when it is windy; braking is thus more difficult due to reduced grip,
• low resistance to overgrowing vegetation (seeds and roots), especially invasive plants spreading from the verges leading to a narrower path.

Using binders (bound gravel) offers better weather resistance (freeze-thaw cycle, erosion, rain) and thus delays general wear and tear of the surface course. But the binder components remain the main problem for the environment. It can be made of salt (strong impact on vegetation and underground rivers through run-off water), be similar to a road hydraulic binder (same components – so same ecological impacts – as cement: crushing of clinker, pozzolan, fly ash, all being GHG emitters), or made of cement-limestone gravel (mix of cement and lime, materials that emit 5 times more CO_2 when they are produced, compared to bitumen).
Furthermore, drawbacks such as rutting in case of rain, cracking in case of roots or germination of seeds brought by the wind, the pulverulence of materials diffusing into the environment (water, air, plants) are delayed due to regular maintenance but are not definitively deleted.

Self-binding gravel

Bound gravel

CONCRETE

Caution under this name, there are two completely different categories that it is important to distinguish because they include materials which are chemically different.

asphaltic concrete, called asphalt, is best known, because it is used on all roads. It is made by mixing aggregates with bitumen, a hydrocarbon binder produced from the distillation of crude oil, in an asphalt mixing plant. Its natural colour is black, real black. In accordance with traffic level and type, laying is made at a higher or lower temperature. The higher the temperature the more negative impact of the product on the environment. This may sound somewhat counter-intuitive, but we will see later that the comparisons of environmental impact between bituminous concrete and bound gravel are largely favourable to the first. Apart from maintenance vehicles, the greenways mainly host very light vehicles or pedestrians: with synthetic binders or, even better, bio-based binders because they come from natural plants, asphaltic concrete, locally manufactured at a lower temperature, achieve a very significant reduction in greenhouse gas emissions (up to - 60%) compared with traditional bitumen. The translucent binders highlight the natural colour of the aggregates so you can get a clear surface that looks just as natural as bound gravel. Visually, a neophyte cannot make the difference between the two surfaces but, in longevity and frequency of maintenance, the difference is quickly noticed by the road manager.

Distinction between bitumen and tar
Tar has not been used on roads since the 1980s. It was produced from coal and the distillation of wood or coal at very high temperatures. An environmental impact that is entirely different from asphalt (derived from crude oil). Talking about tar no longer makes sense because it is no longer used in France to build roads.

hydraulic concrete is made by mixing aggregates with cement or lime and adding water for setting. It has the same CO_2 impacts as the already mentioned cement-limestone gravel. Its use must be reduced to a few special cases, and it is still difficult to define which ones since they cumulate impermeability, important pulverulence, net breaks in case of movements of the supporting grounds...

Modal shift: asphalt by far the favourite

Greenways are adapted to miscellaneous practices. They introduce all generations to the pleasures of active modes and, consequently, promote modal shift.

If we want to achieve the objectives of the Cycling Plan and give French people access to an ecological mobility solution, we must have greenways adapted to diverse practices. They should welcome – in the same conditions of attractiveness, comfort and security – commuters, touring cyclists, people with reduced mobility, roller-skaters, pedestrians, parents with pushchairs – as many users as possible. The maintenance over time of the initial qualities of the pavement surface is the condition for this large accessibility.

Regarding quality of use, asphalt is very popular. You can easily roll on it because the surface is even and rough and does not change over time. In case of emergency braking, the bike behaves well; this can be very different on other surfaces. Passable throughout the year, in any weather conditions, it meets the expectations of almost all users. Only horse riders and sometimes runners prefer soft surfaces. That is why sometimes it is advised to add a small unbound strip along greenways, according to expected uses; this strip can play a buffer role or edge effect, favourable to biodiversity.

year 1

year 3

Immediately and unanimously, users criticize simply compacted gravel. They also criticize bound gravel but less spontaneously because degradations will take some time to occur. Facts complained for: greenways less and less passable after heavy raining leading to ponding; micro-dust diffused into the air that users breathe or into the plants around, due to the wind and gradual decay of the surface, from the edges. Gravel, and even bound gravel, should be overseen and maintained very regularly; otherwise it will decay twice more quickly than an asphalt surface. Weather disturbances happen more and more frequently and the temperature range is increasing. As a result, gravel weaknesses will also amplify in the near future.

Evolution of a section of the Paris-Roubaix cycle route, Villeneuve d'Ascq between 2007 and 2012, year 3. Year 1 & Year 2 sous les 2 autres photos

year 6

Ensuring the success of greenways, the priority to protect the environment

“The most dangerous thing is not riding a bike, it’s not biking!”. Greenways are a great service to society and nature, and this cannot be compared to the drawbacks that come at first with their construction.

Projects of greenways must be seen differently: they should not be considered as damage to the environment with the construction of a new facility that seals and artificialises soils but as a great service to the planet by reducing the use of motorised transport. Global warming comes from vehicles getting wider and heavier to carry a single person over short distances (less than 5 km) and requiring the artificial land take of large spaces to stay parked 90% of their time.
A huge modal shift to cycling thanks to inclusive ways has direct and positive consequences on air quality, noise pollution, global warming, which is good for biodiversity. Too often, modal shift to cycling thanks to a cycle paths network is thought for city centres. Outside urban areas, cycle paths can be replaced by greenways to welcome, on one facility, diverse practices, if these are non-motorised. A multimodal facility is even more useful since public transport services are not efficient there and since vulnerable users are endangered by higher speed differential on unsafe roads.
Obviously the first reflex must be to identify existing rural paths or farm tracks with low traffic which are likely to welcome users at minimal risk of conflict of use and accident with other modes. However, they cannot constitute the entire network of greenways. In April 2022, the article R411-3-2 from the French Highway Code has listed motor vehicles exceptionally authorized to enter greenways: in addition to access to emergency and maintenance vehicles, the article has authorized, in well-defined and limited term, access to the properties along the way (forest or farm plots, lock houses...) with a 30km/h speed limit.
So, the choice of surface is mainly discussed in rural areas. Each surface family has qualities and defects of use; the lack of knowledge and general disinformation about them and their true environmental impact lead residents and sometimes local authorities to make the “wrong choice”. A single argument is given: the natural integration of the surface in the environment. Nevertheless, everything that looks natural is not natural and impacts on the environment are different for each product.

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Environmental assessment of surfacing

Any human intervention has an impact on nature and biodiversity. It is therefore vital to choose the materials and work procedures that have the lowest impact in terms of life cycle analysis.

The results below come from studies carried out by CEREMA, from eco-comparative standards used for road realization (Ecorce2, SEVE) according to the WLCA (Whole-Life-Cycle Analysis) method: the data aggregate extraction or production of raw materials, their transportation, laying techniques and include end of life and recycling. Environment standards considered are GHG emissions, water consumption, ecotoxicity, risks of acidification and eutrophication of surroundings...

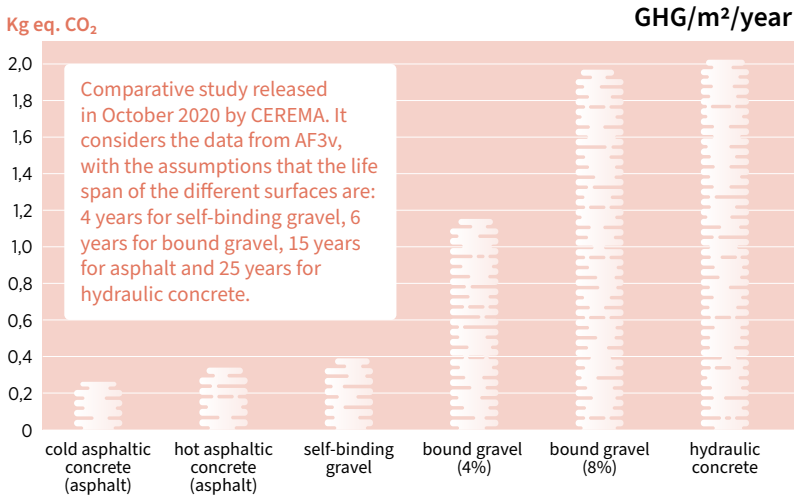
RAW MATERIALS CONSUMPTION

Asphaltic concrete is criticized for the use of a hydrocarbon binder coming from a fossil fuel energy: petroleum. The detractors forget that the solutions such as bound gravel use materials with physico-chemical features which have a stronger impact on the environment when they are produced: combustible gas coming from the firing of clinker at a very high temperature for the cement, etc.
Conversely the circular economy development (with asphalt aggregates recycling) and the use of low carbon footprint additives (such as bio-based binders) can reduce the consumption of natural resources or resources coming from fossile fuel energy for surfaces such as asphalt.

CO_2 EMISSIONS

CO_2/m^2 emissions of bound gravel are more important than those of asphaltic concrete (see Fiche-action N°9 – Revêtement des aménagements cyclables-2019 – Vélo & Territoires). Each type of surface has an average life span (which is longer for a greenway compared to a standard road): around 4 years for self-binding gravel, from 6 to 8 years for bound gravel, far more than 15 years for asphalt, with the necessity to repair sooner or later. If we add these average life spans, we can show the following picture of CO_2 emission/m^2/year.

The GHG emissions are 9 times less important for asphaltic concrete compared to bound gravel. In other words, the carbon assessment of asphaltic concrete is 9 times better than that of bound gravel.



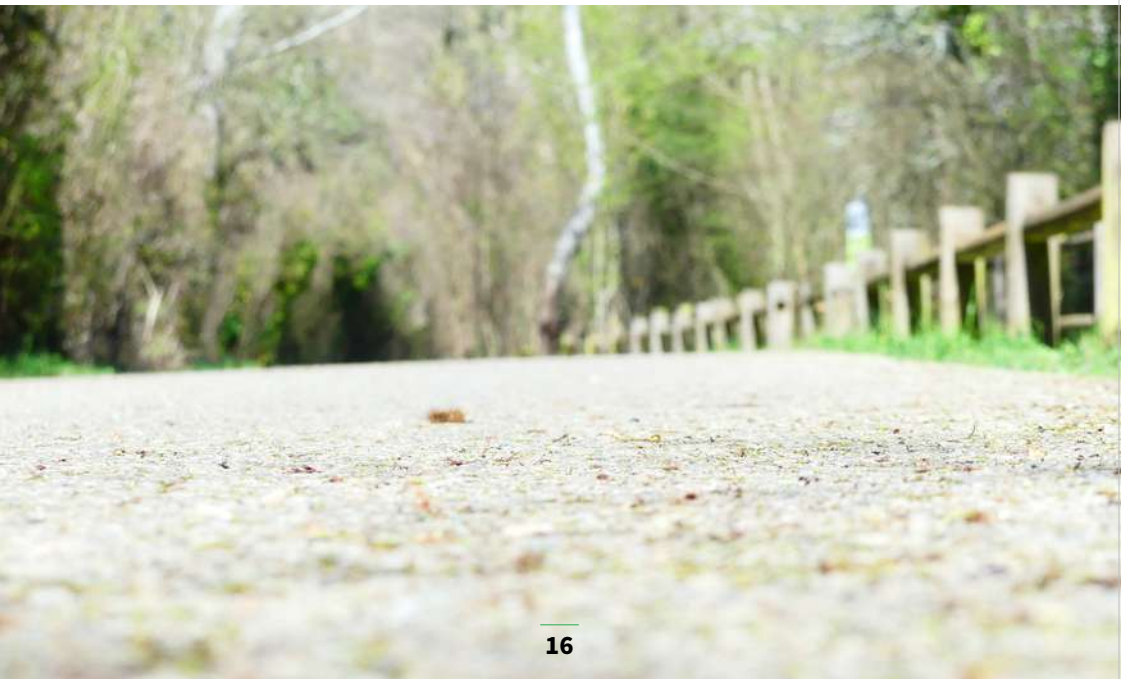
The more cement is used as a binder for bound gravel, the more its carbon footprint overtakes that of hydraulic concrete. Its long life span (over 25 years) compensates for the high GHG emission during its manufacturing. Asphalt using synthetic or bio-based binders does not appear on the study because their use is recent, even if the first tests date back to about fifteen years ago. Even if the performance reported by manufacturers is not yet fully supported by independent analyses (of CEREMA for example), experts agree on the clear improvement made on CO_2 emissions.

SOIL SEALING

Another widely held idea among naturalist and landscape circles is the supposed ability of self-binding surfaces to absorb rainwater. The permeability of self-binding surfaces is actually limited due to compaction and even more when the surfaces are bound with hydraulic or road binders. Gradually, the passages of users (trampling, rolling...) reinforce the impermeability and create rutting and ponding.

A surface like asphalt is generally designed to be impermeable to ensure its durability and to maintain its even and rolling qualities. Technically, if desired, it can have a certain permeability: this depends simply on the initial granulometric choices and the more or less tight cohesion of the aggregates between them. But it must be kept in mind that the proliferation of roots and the degradation of the even surface will happen faster.

The average width of a greenway is 3 meters; so the sealing of the soil generated by the pavement, whatever it is, is without measure with the artificial land take due to road infrastructures requiring road, verges, ditches, separation network to evacuate polluted water... Water falling on the greenway flows through a transverse profile with a slight slope of 0.5%. Free from hydrocarbons, old oils, fine particles from the decomposition of tyres or brake pads, this water only marginally changes the soil hydraulic properties.



CONTAMINATION OF RUNOFF WATER

The main heavy metals and organic matter contaminating runoff water come from automobile traffic (not applicable to greenways) and, to a much lesser extent, from the release of materials making up the road surface.

An asphalt surface is an inert material, which does not release any of its components into the environment, even in rainy weather, and therefore does not pollute the areas it covers (a lot of sources, of which Bitume info n°26, September 2011, p. 15).

On the other hand, self-binding and bound surfaces are far from inert: whether through the release of sand dust into the environment in dry weather or through the run-off of products (including some heavy metal particles) resulting from the decomposition of its binder in wet weather, there are many undesirable effects.

The main risk of polluting the natural environment by releasing toxic products is during the construction phase. A few simple precautions should be taken, such as recommending the use of small-scale machinery to avoid compacting and crushing the surrounding area when manoeuvring, ensuring that the ground is kept moist to avoid dust clouds, storing liquids (fuels, oils) and powdery materials under tarpaulins, etc.

ALDEBO EFFECT AND HEAT ABSORPTION

Albedo is the capacity of a surface to reflect light rays. In the case of a light-coloured pavement (high albedo: 0.20 to 0.40), more energy is reflected into the atmosphere than is the case with a dark surface (lower albedo: 0.05 to 0.15), which absorbs heat.

A priori, this indicator gives an advantage to hydraulic concrete (this is the only environmental criterion that is favourable to it) or light-coloured self-binding surface over dark-coloured asphaltic concrete. The gravel surface layer is generally light (light-coloured aggregates or aggregates of the same colour as the surrounding rock and light-coloured binders), which means that a large proportion of the sun's energy is reflected, while the remainder is not transmitted to the sub-surface concrete layer due to the powdery nature of the material. This explains the relative coolness of gravel at night. This material has no capacity to store solar energy, even though it is quite warm during the day.

However, if the black bitumen is replaced by translucent binders that enhance the light colour of the aggregate, or if the aggregates are bulk dyed, an albedo close to that of gravel can be obtained.

ADAPTATION AND RESILIENCE TO CLIMATE CHANGE

A study of the vulnerability of roads to climate change has become essential because of the increase in frequency and intensity of torrential rain, freeze-thaw periods and the rise in average annual temperature exceeding the 1.5 degrees initially set as an alarming limit in the Paris Agreement. Surfaces are the first to be affected by extreme weather conditions. Choosing a "sustainable" surfacing means ensuring its longevity over time to avoid traumatizing local fauna and flora each time work is carried out on the road, whether for maintenance, repair or resurfacing to reunify the surface course, particularly in the event of root development...

IMPACTS OF SURFACING COMPONENTS ON HEALTH

According to the French National Institute for Occupational Safety and Health (INRS) and epidemiological studies, bitumen is not dangerous under normal conditions of temperature and atmospheric pressure. However, when heated to temperatures over 210°C, it emits fumes that may contain dangerous substances (polycyclic aromatic hydrocarbons, etc.) and irritate the respiratory tract. Today, warm asphalt mixes, used at 110/120°C, offer levels of performance that are more than sufficient for traffic dedicated to non-motorised modes, and have the advantage of presenting no health hazard to site workers. The lower the temperature, the lower the CO_2 impact (-30%), as well as the lower the price per m^2, which is not insignificant.
The INRS also draws attention to the dangers of inhaling dust, whether it comes from crushing minerals or handling pulverulent products, and in particular dust from sand and crystalline silica, which is more relevant to bound gravel surfaces.

Financial assessment

After the "natural" aspect of the surface, the criterion that seems to prevail most often for the choice of surface is their cost. But what cost are we talking about?

It would be wise for the project owners to take into account not only the initial investment cost but also the maintenance costs incurred by the specific characteristics of the surfaces in order to extend their lifespan with a high level of service to the user, all in relation to the average lifespan of the surface, as it is done for road projects. Unfortunately, this is not always the case for greenways. Straightaway, infrastructure specialists will tell you that asphaltic concrete is "much" more expensive per square meter than gravel, including bound gravel. And they will be partly right, but only partly!
The binder added to the compacted material to make it a bound gravel is made from very low-cost products (silica, cement, lime, etc.) because they are manufactured in very large quantities, particularly for the building industry. Conversely, the manufacture of bitumen, treatment in an asphalt plant and the laying technique increase the initial cost. When it comes to replacing bitumen with synthetic or biobased binders, the innovative nature of these products means that their cost is currently higher than other solutions.
On the other hand, due to the good preservation of its characteristics over a long period of time, asphalt surfacing, despite a higher initial cost per m2, quickly becomes profitable because it requires little or no maintenance during the first 15 years of its existence. On the contrary, for gravel surfaces, it is necessary to anticipate the need to compensate for the proven risks of deformation of the surface course by reinforcing the subbase course from the start. This represents an additional cost: the laying of the surface per m^2 is therefore not the only feature to be considered. The frequency of maintenance and the shorter lifespan must be considered from the start of the project.

Integration into the landscape

There is regularly strong opposition to the creation or renovation of greenways, on the grounds that they are "concreting" the countryside. In France, all cycling facilities together account for just 0.2% of artificial areas. The argument may therefore seem a little exaggerated, even if it is important to ensure that greenways are well integrated visually.

IMPACT OF GREENWAYS SURFACING ON SOIL ARTIFICIALISATION

According to the nomenclature annexed to the decree of 11/27/2023 relating to the assessment of the artificialisation of soils (art. R 110-10 of the French urban planning code), the following are recognized as artificial surfaces:

- (paragraph 2) areas whose soils are sealed due to surfacing (artificial, asphalted, concreted, covered with paving stones or slabs);
- (paragraph 3) partially or totally permeable surfaces whose soils are bound and compacted or covered with mineral materials, or whose soils are made up of composite materials (heterogeneous and artificial cover with a mixture of non-mineral materials).

This nomenclature specifies that linear infrastructures less than 5 m wide are not included in the count. With an average width of 3 m, greenways are therefore excluded from the monitoring system for the French objective of Zéro Artificialisation Nette (Zero Net Artificial land take) (ZAN) by 2050.

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INSERTING A GREENWAY INTO THE LANDSCAPE

The "black ribbon" that looks like a road provokes a lot of reactions. First, a 3-metre- wide infrastructure should not be confused with a road at least twice as wide. Most of the time, the viewing cones on the greenway are limited, as it fits into the contour lines of the landscape. In addition, asphalt concrete lightens over time to a mouse-gray color and, as we have seen previously, the light and pseudo-natural appearance of the surface is not at all incompatible with the choice of asphalt. It is rather the question of price that can pose a problem. This is why we can differentiate between sections of way and, in areas of high heritage or tourist value, treat certain points in an ad hoc manner, with surfaces better suited to the integration of the way on the site.

Consideration of biodiversity

Despite all the precautions, any development will disturb the natural environment in which it is located and will inevitably contribute, to a greater or lesser extent depending on its size and use, to the modification of local biodiversity. However, there are many examples that demonstrate the compatibility of greenways with natural area protection schemes.

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PRESERVING BIODIVERSITY IS NOT A QUESTION OF SURFACE

Developing a greenway is an essential action to reduce GHG emissions through modal shift. But this action also disrupts species or habitats that may be protected or have a high heritage value. The preservation of biodiversity must come before any other consideration (Biodiversity law of 2016).

Even if they are disused sections of road or railway line, these “wastelands” have been reclaimed over the years by animal and plant species.

As far as biodiversity is concerned, the issue is not the surface itself, but rather the immediate surroundings of the greenways. In terms of the impact of surfacing on biodiversity, there are no scientific arguments in favour of either solution. The only argument in favour of gravel surfaces is somewhat specious: they attract less traffic because they are often uncomfortable, or even dangerous or impassable, depending on the weather conditions, and mechanically they are less disruptive to the biodiversity surrounding the way. This argument must be absolutely rejected: designing a facility in such a way that it is underused is totally contrary to the three basic pillars of sustainable development, i.e. development that is economically efficient, ecologically sustainable and socially equitable.

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Greenway in Southern Burgundy, Bois Clair Tunnel

“LIMIT, MITIGATE, COMPENSATE” SEQUENCE

The climate challenges of modal shift are such that it is better to abandon all projects to create new roads and motorways in favour of alternative modes, train, public transport, in close intermodality with active modes. We cannot “limit” catching up with France’s delay in cycling facilities and greenways, but we can “mitigate” the environmental impacts by making the right choice of surface, limiting the pollution induced by the materials and also limiting night lighting, clear cutting, the use of phytosanitary products, interventions during the breeding season... More precisely, to mitigate and compensate, it is advisable to have a biodiversity atlas of the territory crossed to have a detailed understanding of the issues at stake. Which species? Protected or not? Can they be moved or not? And if the crossing of a particular natural area or site is problematic, solutions must be found.

Example: on the greenway linking Mâcon to Cluny (Saône-et-Loire), the Bois Clair tunnel is home to protected species of bat. Every year, the tunnel is closed to traffic during the hibernation season (from October to April).

In a normal operating cycle, the major risk of biodiversity disturbance comes not from the surface itself but from activities related to the maintenance of the vegetation bordering the greenway: use of pesticides and detergents for weeding, use of pruning machines, etc. The creation of a charter for the maintenance and differentiated management of the lateral spaces is strongly recommended. The companies in charge of the execution should be advised about the conditions and periods of intervention (excluding nesting, reproduction, hibernation, etc.), the prohibited products, the preferred techniques, etc.

GREENWAY AND ECOLOGICAL CORRIDOR MUST NOT BE CONFUSED

The greenway promotes non-motorised travel, and its use is expected to increase. The ecological corridor promotes the movement of fauna and flora so that species can feed, reproduce, and rest, thus ensuring their life cycle. Human presence, whatever it may be, is not desired. In the same vein, greenways should not be integrated into the green and blue (and black) infrastructure projects that ensure ecological continuitys.

ENCOURAGING CONSULTATION AT A VERY EARLY STAGE OF THE PROJECT

By bringing together, from the outset of the project, the different types of users, the representatives of local environmental associations and the project owner, it is possible to collectively define the priorities and the singular points which will require special attention. A project should not be seen as a block: a fine, sometimes “surgical” approach, and sound scientific arguments often make it possible to solve problems.

COMPATIBILITY OF GREENWAYS WITH SYSTEMS FOR THE PROTECTION OF SENSITIVE NATURAL AREAS

One notable example is the greenway of the Île du Beurre, south of Lyon, which has seen a tenfold increase in use since a vegetable-based asphalt surface was laid. However, this island benefits from a biotope protection order due to the presence of a colony of European beavers, a protected species, and the specificity of certain plants. At the same time, the Île du Beurre is on the ViaRhôna cycle route, a EuroVelo route that connects Lake Geneva to the Mediterranean Sea. The choice of asphalt or gravel was therefore carefully considered. The durability of asphalt compared to gravel, its almost zero maintenance requirements, and its inert nature (no release of pollutants or toxic products in the life cycle) prevailed because it avoided disturbing the species and their habitat several times.

Photos: Via Rhona route, Butter Island

Greenway in Savigny-sur-Orge (91)

CONCLUSION

While the choice of surfacing may have arisen as the network of cycle routes developed in the country, everything now shows that this question should no longer be an issue. In addition to its longevity and resistance to extreme temperatures and the intensity of climatic events, the family of bituminous concretes and derivatives known as “asphalt” has a better cost/benefit ratio in many aspects: water pollution, carbon footprint, sustainability, non-pulverulent character, modal shift... As soon as some additional precautions are taken, for example the shade of the binder, other positive impacts are induced: better landscape integration and elevation of the albedo.

At a time when mobility is a real issue for ecological transition, when authorities say they want to act in favour of active mobility, it is essential to make the right development choices today, the right investments for the future. Like the road network and car traffic, authorities have a major part to play in creating a continuous, comfortable and safe network of greenways, and this requires choosing the right surfacing.

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Synthetic binder asphalt: Colclair
Colclair is a range of clear and coloured surfaces featuring Bituclair, translucent synthetic binder possibly combined with a bio-based binder. Colclair coatings come into their own when revealing the natural shade of the aggregates. But they can also be bulk dyed. Thanks to the range of colours, Colclair can showcase urban heritage sites. It can also create distinctions between different sections within public spaces and on the road. **Cycle paths, bus lanes and pedestrian zones can all be in different colours without sacrificing the properties of the best asphalt solutions.**
Thanks to lighter colors, Colclair lowers the pavement temperature to offer local residents and users greater comfort.
Four techniques are used with the Colclair range to accommodate the specificities of each individual project: the goals, the site and its intended use.

The technical characteristics of the Colclair range are on a par with those of coatings from the same family and that feature a classic asphalt binder.

PLANT-BASED BINDER ASPHALT

Vegecol is an aesthetically pleasing clear asphalt mix with a carbon footprint that is average 70 % lower than traditional clear asphalt.
It achieves this by using a predominantly bio-based binder – that stores biogenic carbon in its plant-based components, and by using a lower manufacturing temperature.
Vegecol does not require surface treatment to retain the aggregates natural colour.
It produces aesthetically pleasing pavements, mainly for light-traffic pathways (pedestrian paths, cycling paths, etc.). Vegecol is suitable for service traffic and few light vehicles.

Vegecol is compatible with local aggregates that are adapted to the site's needs, allowing it to seamlessly fit into the local environment and to uphold the site's heritage: squares, architectural sites, alleyways, Natura 2000 sites...

Cycling facility made with Urbalith asphalt in Locmiquelic (29).
© Colas.

URBALITH

Organic-mineral binder asphalt:
Urbalith is a range of permeable pavements, with natural appearance and recyclable, designed to comply with specifications for a lower impact on people and the environment. Urbalith's compliance with these specifications – which comprise 14 different criteria – is periodically checked by an independent body: the French National Institute for Industrial Environment and Risks (Ineris). This means that Urbalith can be used in ZNIEFF (Natural Zones of Ecological, Faunistic and Floristic Interest) and Natura 2000 zones. Urbalith's natural look and the fact that it doesn't require expansion joints make it highly aesthetic, which allows it to be used on classed or architectural sites. Urbalith is made from a cold mix of aggregates and an innovative transparent organic-mineral binder, making it an integral part of Colas' ecofriendly approach.
Unlike resin, Urbalith contains no volatile organic compounds (VOCs): safe for human beings and their environment, from pavement construction phase to end of life.
Urbalith effectively combats urban heat islands: it features an albedo between 0.3 and 0.5 (depending on the type of aggregate).
This pavement is particularly well suited for soft traffic.
Its high permeability can be adapted as required (3 to 5 cm/s). Its carbon footprint is at least 50% lower than that of a deactivated concrete reference solution (taking into account production and laying).

PARTNERS

EIFFAGE ROUTE

EIFFAGE SOLUTIONS

Eiffage provides an eco-friendly offer of permeable surfacing solutions which have many interesting features. They make it possible to limit soil sealing, reduce the risk of flooding, withstand heatwaves, better manage run-off water, improve road safety and re-naturalise outdoor spaces.

BIOKLAIR®

Eiffage Route's Bioklair® is a natural surface course made with light-coloured aggregate and bio binder to enhance the landscape. It is the eco-friendly choice for soft mobility paths and urban developments.

Bioklair® benefits

- Low carbon impact thanks to plant-based materials.
- Light-coloured material and permeability for effective protection against urban heat islands (UHI).
- Particularly suitable for cycle paths and other soft mobility infrastructures.
- Suitable for facilities needing an attractive natural look.

Why choosing Bioklair®

Addressing the need for an attractive, eco-friendly and lifestyle-enhancing surfacing material, Eiffage Route's R&D specialists developed Bioklair® to enhance public spaces. When laid, the caramel colour of its plant-based binder initially dominates. As time passes, however, the material colour gradually takes on the colour of its constituent aggregate. This means that you can give your paths and public spaces the natural finish of your choice. For example, you can obtain a very light coloured appearance using crushed limestone, or a reddish orange using ochre chippings..

The cornice in Marseille.
Bioklair asphalt. © Eiffage

BIOPHALT®

Contemporary R&D efforts to enhance the mechanical performance of surfacing materials systematically seek to also limit their environmental impacts. Biophalt® plant-based asphalt developed by Eiffage Route perfectly illustrates this winning formula. This material is suitable for a wide range of applications, from quiet minor roads to motorways and other heavy-traffic roads.

Biophalt benefits®

- A labeled plant-based binder that acts as a biogenic carbon sink.
- High recycled material content (min. 30%).
- Low temperature production, to save energy.
- Asphalt suitable for all types of traffic, including very heavy motorway traffic.
- Levers for reducing carbon dioxide emissions.
- Use (plant-based or biosourced) renewable materials in place of fossil resources.

Eiffage Route's product development strategy has for many years considered environmental factors alongside the purely technical approach. The aim is to offer less impactful solutions by activating two key levers: energy savings and decreased consumption of non-renewable materials such as aggregate and bitumen. Substitute materials developed using plant-based chemistry are a particularly effective means to this end. Our R&D teams have risen to the challenge of perfecting a plant-based asphalt with equivalent or superior mechanical properties to conventional bituminous asphalt.
Our research personnel developed Biophalt® asphalt using tall oil pitch, a coby-product recovered from the paper-making process. Its polymer-adjusted, plant-based binder makes it suitable for even the heaviest categories of traffic, and all the more to traffic linked to active modes. It also has a unique ability to regenerate the aged bitumen, allowing high recycled material contents.

Biophalt® asphalt is highly resistant to temperature variations, reducing the risk of rutting (in very hot weather) and cracking (in very cold conditions). Biophalt® asphalt significantly reduces the environmental impact of your projects. This is achieved in part due to the plant-based nature of the binder, which is an alternative to hydrocarbon-based bitumen. This binder recovers a residue previously used mainly as a carbon dioxide-emitting fuel, converting it to a biogenic carbon sink instead. Thanks to its high recycled aggregate content, Biophalt® also decreases consumption of quarried new aggregate (non-renewable natural resources).

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