The Pothole Solution - A Guidance Note by the Road Surface Treatments Association

If we're going to tackle the pothole problem, we cannot keep doing the same thing, and expect a different result, therefore must get back to some basic road maintenance principles, learning from local highway authorities who are making the best use of available funding to manage their road (and footway/cycleway) networks.

Budget shortfalls in some cases, have forced historic short term policy decisions, which have often cost more in the longer term, whilst impacting negatively on asset performance and condition.

Untreated asphalt surfaces naturally degrade through a process of ageing, trafficking and exposure to the elements (including water and UV light) causing it to crack, which then leads to water ingress into the fabric of the road, and the damage that results in potholes and complete failure.

If we are to make the best use of the recently announced, record highways maintenance funding, we need to consider the 'life of a road', understanding the mechanisms of failures, and the timely opportunities to implement interventions, which include :

- **Recommendation 1 – Regular planned cyclic maintenance to highway drainage**, to remove water from the highway, which otherwise penetrates into the fabric of the road, leading to damage that causes potholes

A 60% reduction in planned, cyclic gully emptying in one example local highway authority - introduced to meet revenue budget pressures -ended up costing several times more than the savings because the authority then had to deal with the gully issues reactively rather than proactively.

Whilst part of the solution would be to secure increased, ring fenced highways maintenance revenue funding from Government, there are example local highway authorities however, who have adopted a risk based approach to drainage maintenance, through use of data and systems, to target available funding to high risk areas, reducing reactive responses.

- **Recommendation 2 -** Invest in early life, low cost, **preventative road maintenance treatments**, which seals the surface and prevents the damaging effects of water ingress, whilst extending asset life (and in some cases restoring texture)

If overnight, we resurfaced every single road, we'd still need to plan how we're going to manage that network, otherwise we would face the same problems again in 10-15 years time. Whether a road is newly constructed or freshly resurfaced, a strategy for how that road will be maintained, is essential.

And that first preventative intervention opportunity comes at around years 5-6 in the form of **asphalt rejuvenation or preservation,** to keep good condition roads, in good condition.

Shortly after; roads at mid life have a window for **surface dressing or microsurfacing (cold applied ultra thin surfacing - CAUTS - on higher use roads)**.

But if that window is missed, you're at risk of having significantly more expensive interventions (including pothole repairs) from years 10-15! So why not plan that first intervention?

61% - The reduction in preventative surface dressing since 2008, at its lowest in 2023.

22,800 miles of roads (that's 10% of the UK road network) that would have been surface dressed (therefore sealed for 10-15 years), if we had continued to surface dress at levels recorded in 2012.

50% The potential cost savings of managing an asphalt road using preventative interventions, compared to replacing on fail, over a 60 year lifecycle.

There's even been a departure from repairing failing joints (and cracks), which are often left until its fully fretted out and repaired as a safety defect and patched (introducing four joints, which could be susceptible to failure). **Crack and joint repairs** are simple and cost effective

- **Recommendation 3** - Focus on **permanent, planned patch repairs,** (even if this has to be a follow up to temporary 'make safe' repairs), instead of repeat visits to defective areas.

15 visits at £106.52* (Reactive) = **£1,598**

Vs

7.5m2 x £55.44* (Planned) = **£416**

*reactive and planned repair costs taken from 2025 AIA ALARM Survey

2.5million m² of permanent planned patched repairs, that could have been completed, with the £143million spent on 'pothole repairs' in 2024.

50% - minimum potential saving, of investing in planned permanent repairs, compared to repairing reactive, safety only defects.

Investing in capital funded permanent, planned patch repairs, is more cost efficient, reduces reactive potholes, and is better perceived by the travelling public.

In addition to 'cut out and reinstate with hot material' (**conventional patching**), many local authorities are embracing alternative, cost and/or time efficient, patching methods, which include :

- **Thermal patching**
- **Spray injection patching**
- **Polymer modified mastic asphalt (PMMA) patching (non intrusive)**
- **Polymer modified mastic asphalt (PMMA) grouted materials (intrusive – including around ironwork)**
- **Cold materials**
- **Cold insitu recycled patching**

- **Recommendation 4 - Cold recycling of end of life, crumbling roads**; either insitu or exsitu, making use of existing asphalt / granular materials that are already bought and paid for, in the construction of the new road

Significantly more roads could be replaced using recycling, than compared to conventional methods of reconstruction.

Existing materials are repurposed, and bound with emulsion, foamed bitumen or cement.

Some local highway authorities report that many of their roads have suffered the historic effects of not adopting preventative maintenance and are now approaching or have reached, end of life.

There are exemplar local authorities in this position who are embracing the opportunity to recycle these roads, to provide a cost effective solution of replacing the road, to include:

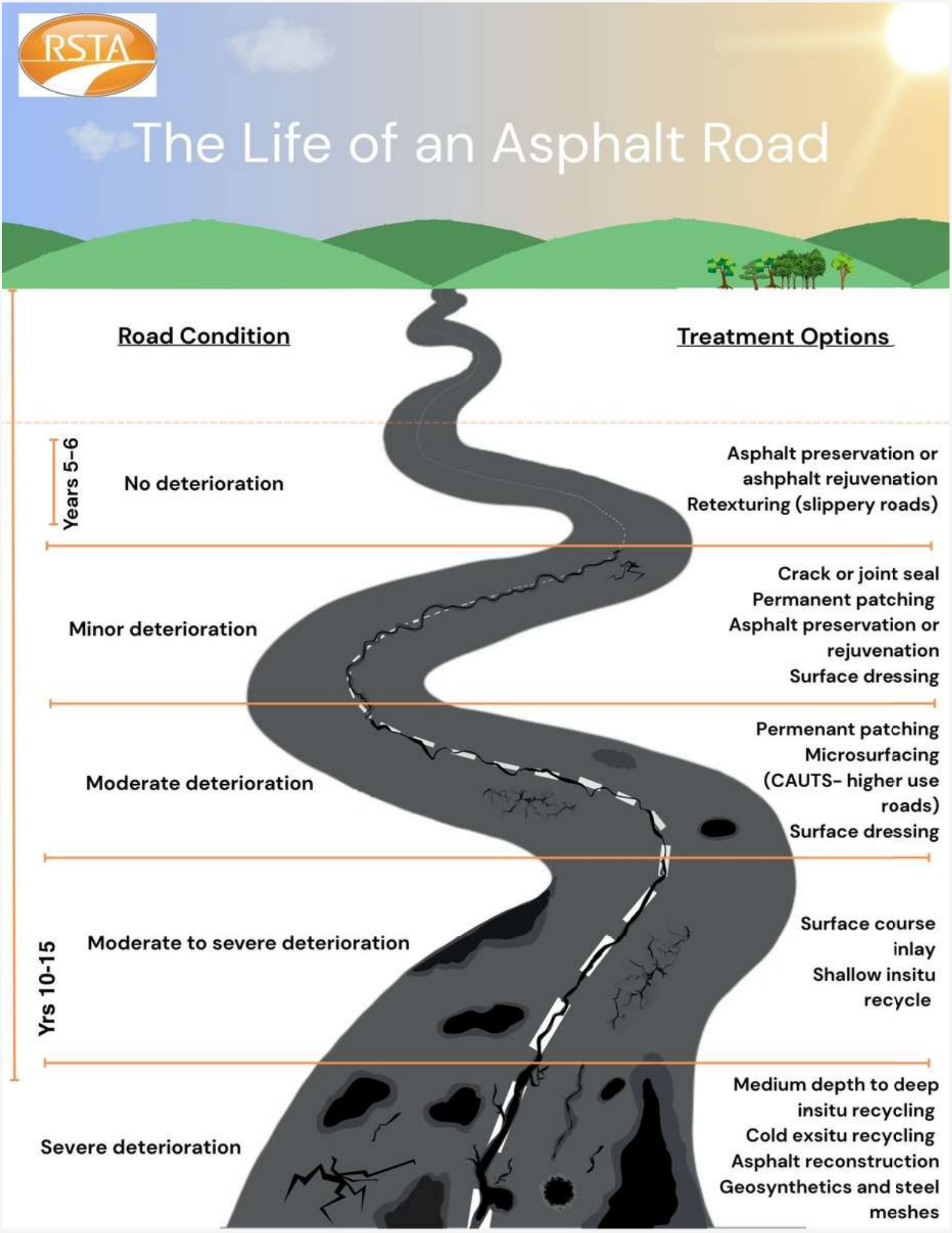
- Shallow recycling (Retread) – typically 85mm depth
- Medium depth recycling (Regen) – typically 150mm depth
- Deep recycling – up to 325mm depth

Cold recycling also offers an opportunity to add construction to evolved roads with minimal road construction, to meet the demands of modern traffic. Materials can be imported to enhance construction, including tar bound materials (subject to EA guidance).

Exsitu recycling could be used in replacement of binder or base course materials.

Where end of life roads are being surfaced they could be enhanced and made more resilient by the use of **geosynthetics and steel meshes** between replacement asphalt layers (typically below the surface or binder course), which will protect against future reflective cracking.

The Life of an Asphalt Road



These are possible treatments options, and will be subject to assessments that consider the type of defects, the site (local knowledge); including its environment, its use, traffic volumes, construction, testing etc.