Benefits and Negatives of Concrete Pavements

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Benefits

The beneficial attributes of concrete pavements can be summarised as:

1. Longer lasting – 40 year Design Life (some States in US are already using 50 years and even this may increase in the future).
2. Heavy duty Pavements have generally the lowest cost.
3. Pavement maintenance costs are up to 10 times cheaper than the same for flexible pavements.
4. Minimum maintenance requirements result in less traffic disruption, minimum congestion time and as a result Work zone safety.
5. Lowest Life Cycle Cost of all Heavy Duty pavements and highest salvage value.
6. Can be constructed over poor subgrades.
7. Thinner overall pavement thickness = lower consumption of raw materials.
8. Resistant to abrasion from turning actions.
9. Not susceptible to high or low temperatures.
10. No affected by weather, inert to spills and fire.
11. Completely recyclable.
12. High abrasion durability.
13. Profile durability.
14. Safer because it maintains its shape, no deformation, resistance to rutting and potholes and excellent skid resistance.
15. High sustainability rating through use of local materials.
16. Use of waste products like flyash and slag.
17. Riding quality does not deteriorate.
18. Can be slipformed up to 13 m.
19. Saving of fuel costs of at least 1.1% over asphalt (VTI Sweden – 1.1% 2008, NRC Canada – 0.8 to 6.9%).
20. Light colour enhances night visibility.
21. Less energy for street lighting (up to 30%).
22. Less heatsink effect (av 8°C lower than asphalt = less air conditioning energy in urban areas.
23. Longitudinal diamond grinding, called Next Generation Concrete Surfacing (NGCS) now provides quieter surface than for example Open Graded Asphalt overlay.
Negatives

1. To provide economics and quality, it requires larger projects
2. For required quality and finish, slipforming is essential
3. Green field sites provide maximum economics
4. The operation must have its own batch plant
5. Set-up costs are significant
6. Slipforming must have a minimum length 200 m of paving runs available
7. Concrete must have a minimum compressive strength before the pavement can be trafficked. (Theoretically only about 4 MPa, but Client Specifications often call for 20 MPa)
8. Slab repairs or replacements, if required, take longer
9. Transverse texturing creates high frequency noise that can be objectionable to some motorists. (Concrete = 1100 Hz vs Asphalt ~800 Hz)
10. Tyre/road noise can become a nuisance issue in urban areas after 80/90 km/h speeds (if allowed)

Evaluation with the use of the Principles for Pavement Selection will demonstrate and highlight the locations or situations where a flexible pavement must be preferred for concrete.