

Construction of flexible pavement

The granular materials for capping and sub-base are graded and dozed with the grader. Then they are constructed using compaction techniques. Thickness must be 150 mm or less to allow a good compaction. When the layer is bigger, then several sub-layers are created. The use of rollers is crucial for this work.

In general, bitumen-bound materials are laid using a paving machine, although small areas may be laid by hand. The function of the paving machine is to lay even thickness of material in strips usually in widths of 2.5 to 3 m. It lays the material at the right temperature and tamps it ready for compaction by the roller. Bitumen and tarmac-based materials requires a work temperature of between 95 to 190°C.

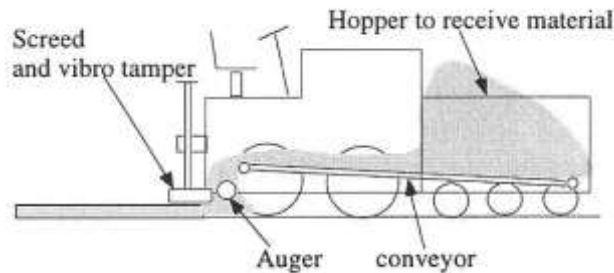


Figure 1. Paving machine. (Warren, 1996).

The principal of operation is that insulated trucks deliver the material into the hopper and it is taken by conveyor to the spreading augers. The augers spread the material across the width required and it is then tamped to an even surface by the screedboard and vibrotamper. The thickness of the material can be controlled manually or automatically by the use of sensor attached to averaging bar mounted along the side of the machine.

The contractor must ensure an uninterrupted supply of material at the correct temperature, and never start laying with less than two supply trucks on site.

Correct rolling is very important to the quality of the finished surface. Rolling is carried out with a 8 to 10 tonne dead-weight roller or a tandem vibratory roller. The dead-weight roller allows rolling to take place at higher temperatures and gently pushes the material into its compacted position, but it does not compact edges very well. The tandem vibratory roller can compact the edges well, but can be too violent with uncompacted material. The combination of both is the best solution.

Construction of rigid pavement

The concrete is poured and moulded by the paver. Fixed pavers required side formwork to be placed at the pavement edges and not to be removed for several hours after concrete placing. These have now been replaced by slip-form pavers whereby a carpet of concrete is placed without the need for side-forms. However, much stiffer mixes are required for the concrete to maintain shape without side supports.

If the finishing of the road is with concrete, the concrete surface must be textured to improve skid resistance, usually by mechanical wire brushing. The finished surface should be sprayed with a curing compound. Although paving machines are capable of travelling at 20 m/min, the logistical problem of supplying large quantities of concrete usually limits production to about 1000m per day.

Contraction and expansion joints must be developed:

Contraction joints: They allow the slab to shorten as its temperature drops. At the contraction joint there is a crack inducer that helps to break at this point in case cracking occurs. This joint is in the area of reinforcement (whenever we have a reinforced slab), and reinforcement is continued.

The spacing of these joints depends on the reinforcement.

- For unreinforced slabs, if they are thicker than 230 mm, contraction joints should be every 5 m. For slabs under 230 mm thick, it should be every 4 m.
- For reinforced slabs, there is a standard distance of every 25 m.

Expansion joints: They allow the slab to expand as its temperature increases above that at which it was cast. These joints are very effective for day-and-night temperature difference. This joint is complete, cutting the whole section of the slab. Reinforcement can be also cut or cased in this zone to allow free movement.

They replace every third contraction joint. With unreinforced concrete, it is at a spacing of 12-15 m. With reinforced concrete, the spacing is increased to 75 m.