Hot on hot
Hamm tandem rollers for InLine Pave work

Project: Construction of a federal highway near Dresden, Germany
Machines: DV 90 tandem rollers
Technology: Oscillation
Compacting with HAMM oscillation rollers: Ideal for two-layer asphalt paving

Conventional blacktop paving comprises three processes: laying the base course, laying the binder course and laying the surface course. Now there is an interesting new alternative. For some time now VÖGELE, the market leader in asphalt pavers, has been offering the new, revolutionary „InLine Pave“ process. This combines the laying of binder and surface courses into one process. Tandem rollers behind the InLine Pave train compact the asphalt. An analysis of this final compaction showed that dynamic compaction using oscillation gave the best compaction results. This was conclusively demonstrated during construction of the 5.5 km B178 (n), around 80 km south-east of Dresden, using HAMM DV 90 tandem rollers.

The local highways department at Bautzen explicitly requested the use of “compact construction techniques“ for the build, as this system drastically lowers costs and the consumption of resources. „With this technology it’s important that both types of asphalt are delivered at the right rate, to the appropriate quality and in the required quantity. If all this is done correctly, the costs can be halved right from the very first metre“, enthused one of the responsible engineers at STRABAG – the contractor – concerning the efficiency of the VÖGELE process.

Oscillation wins – both commercially and technically

An additional increase in cost-effectiveness comes with the use of HAMM oscillation rollers. These compactors use the advantages of dynamic compaction and achieve the required degree of compaction in no time at all.

This added value was put to good use during construction of the B178. Right behind the paver, two HAMM DV 90 tandem rollers compacted the asphalt perfectly. Adviser Gerd Lenz from HAMM explains more: „We carried out a series of tests on this site to compare the compaction results of a DV 90 with oscillation against those of a DV 90 with vibration. The analysis showed that oscillation compaction is by far the best method for use with the InLine Pave process.“ This is why the team only used the DV 90 with oscillation during dynamic compaction for this particular building work.

In this application, the reasons for the superiority of the oscillation as compaction method lie in the configuration of the two layers. Whilst a conventional asphalt pavement has surface and binding courses that are 8 cm and 4 cm thick respectively, the relevant figures for two-layer applications are 10 cm and 2 cm. „The relatively thin surface course would be impacted so hard during vibration compaction that the material would shift“, claims Gerd Lenz. He explains: „Under certain conditions the course bonding can even be destroyed. The conditions are much the same as when compacting thin-layer paving, which can also only be compacted statically or by using oscillation.“ HAMM oscillation rollers reduce these risks. Compaction can be done dynamically and rapidly to give a perfect texture with excellent skid resistance properties.
Oscillation: effective, quick, low-impact

Vibration or oscillation: what are the differences between the two compaction methods? Traditionally, vibration rollers are fitted with a circular vibrator in the roller drum. Depending on the rotational speed and mass of the vibrator, centrifugal forces of varying strengths are created and transferred vertically to the ground via the vibrating roller drum. If the material is sufficiently compacted after a certain number of passes, any more exposure to vibration will lead to damaging particle destruction or undesirable loosening of the compacted layer.

The conditions in oscillation technology are quite different: here, a moment is generated by weights spinning in the same direction about the roller drum. The moment changes its direction of force once per revolution of the weight and generates a horizontally oscillating movement of the roller drum. This means that shear forces oriented forward and backward are directed into the asphalt. Thus, the resulting vibratory loads are only about 10% of the level that occurs in the vibration process. Furthermore, the roller drum always maintains contact with the asphalt. This permanent load contributes to a quick and even compaction. In all, the reduced vibratory load mean the process is extremely effective and low impact, not least on the machine.

The background to oscillation

Dynamic compaction systems significantly increase the compaction performance of a roller. Their effectiveness lies in the fact that vibrations are induced in the asphalt. This results in particle displacement and a more compact structure.

With oscillation, the amplitude adjusts itself in relation to the rigidity of the subgrade material. The oscillation system developed by Hamm is not based on complicated mechanical regulating mechanisms, but is an intelligent application of physics. The amplitude decreases continuously as the rigidity of the soil or asphalt layer increases. The power transferred to the ground increases accordingly as the amplitude decreases.

The oscillating movement generates a very even mix of bitumen and particles with good surface roughness. This results in excellent skid resistance and a correspondingly high level of traffic safety.
The InLine Pave train from VÖGELE and oscillation rollers from HAMM – a perfect team. While the two pavers and the feeder lay the binder and surface courses in one process, HAMM DV 90 tandem rollers deliver rapid compaction and excellent skid resistance.

Highlights of the DV series

The all-wheel-drive tandem rollers of the DV series are available with vibration or oscillation drums or as combination rollers with operating weights of between 4 and 9 tons. The rollers have received multiple awards for their excellent user-friendliness. They impress further with their highly effective compaction technique and many useful features. Here are some of the highlights:

- The allround-view concept of the DV rollers offers a clear view of the roller drums through the glass panels of the panoramic cab.
- The seat can be moved horizontally right up to the edge of the cab. Depending on the model, the cab can even be moved laterally beyond the edge of the machine. This gives the operator the best possible view of the roller drum’s edge.
- The modern HI-DRIVE driving and steering system enables the seat to be turned around automatically when reversing. This means the driver never has to drive backwards.
- Water consumption can be optimised as the sprinkling system can be finely adjusted.
- Hammtronic, HAMM’s electronic machine management system, ensures minimal fuel consumption, low noise emissions and optimum engine speed.
- If visibility is poor or if it is dark, 16 bright floodlights provide good illumination and contribute to safety.

DV 90: a guarantee of high productivity

Back to the InLine Pave construction near Dresden. There, the DV 90 VO oscillation roller achieved the required degree of compaction after three passes. The oscillation roller drum was working at 42 Hz and generated a compaction force of 167 kN. Thanks to their staggering productivity, the two DV 90 all-wheel-drive tandem rollers were able to keep up effortlessly with the pace of construction on the 7.5 m wide road surface.