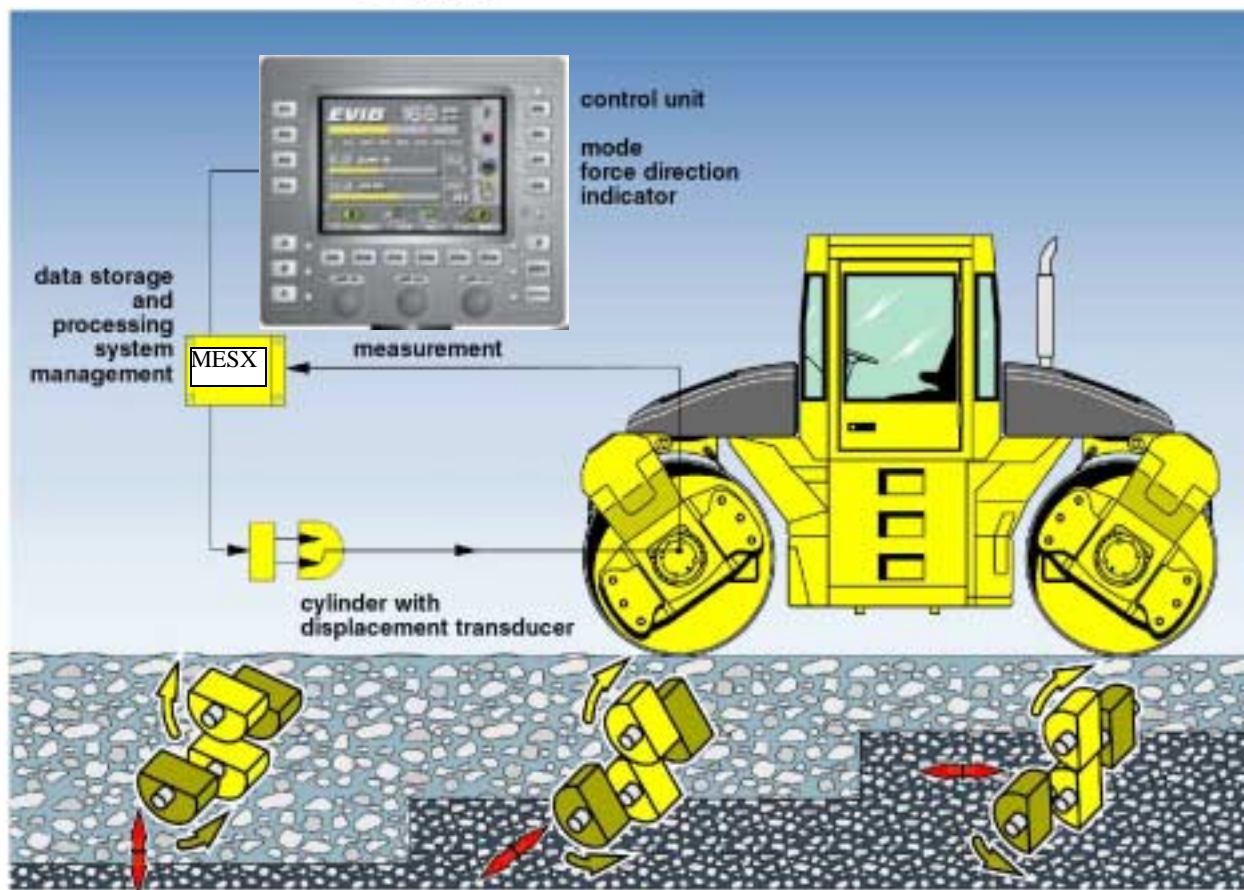


# BOMAG

## Service Training



## Tandem Roller Bomag Asphalt Manager

## Table of contents

<b>Foreword</b>	<b>A 1</b>
Documentation	A 2
<b>General</b>	<b>B 1</b>
<b>Innovations</b>	<b>B 3</b>
<b>Description and function</b>	<b>C 1</b>
<b>Compaction measuring system</b>	<b>D 1</b>
BEM	D 1
BAM	D 2
<b>BAM - System</b>	<b>E 1</b>
Exciter unit	E 3
Hydraulic diagram	E 5
Gear pump	E 7
High pressure line filter	E 9
Valve block	E12
Control motor	E15
Acceleration transducer	E 15
MESX control	E 15
BOP	E 15
Temperature sensor	E 15
Speed sensor	E 15
Printer	
<b>Drums</b>	<b>F 1</b>
<b>Repairs and adjustments</b>	<b>G 1</b>
Replacing the control motor	G 2
Potentiometer fine tuning	G 4
<b>Trouble shooting</b>	<b>H 1</b>

**Electrics**

**MSEX Service Training**

**Wiring diagram**

**Hydraulic diagrams**

## Foreword

Reliable construction equipment is of greatest advantage for all parties involved:

- for the customer/user it is a basis for an exact calculation of utilization periods and the completion of projects as scheduled.
- in the rental business it means that the equipment can be reliably used and planned without having to stock a large number of stand-by machines.
- for the manufacturer it means that customers are satisfied, provides him with a good image and gives him a feeling of confidence.

It is BOMAG's philosophy to design and produce the machines with highest possible reliability. This aspect of simple and easy maintenance was one of the key issues when developing and designing the machine:

- the location of components in the machine eases maintenance work,
- the high quality standard of BOMAG is the basis for the considerable extension of the service and maintenance intervals.
- the After Sales Service of BOMAG, including excellent operating and maintenance instruction manuals, high quality training courses and on-site machine demonstrations helps the customer to maintain their machines in good condition over a long period of time.

Permanent training of BOMAG's own service personnel as well as the service personnel of BOMAG Profit Centres and dealers is therefore a general prerequisite for BOMAG's excellent world-wide service.

This program of permanent training is only possible with appropriate and up-to-date training material for trainers as well as persons attending the training courses.

This training manual has not only been written as a support for the professional work of the trainer, but also for the trainees attending these training courses.

The different levels of product training demand, that the training performed by BOMAG, its Profit Centres or its dealers reflects the high quality of the training conducted at the Training Centre at BOMAG in Boppard. For this reason we invested a lot of time in the preparation of these materials .

The structure of this training manual enables us to change or up-date individual chapters in case of alterations to the machine.

## Documentation

These training documents "**Bomag Asphalt Manager**" are valid for the following tandem rollers:

### Articulated tandem rollers

**BW 141 / 151 / 154 AD/AC-4 AM**

**BW 161 / 190 / 203 AD-4 AM**

### Pivoted tandem rollers

**BW 170 / 174 AD/AC-2 AM**

**BW 184 AD-2 AM**

For the BOMAG machines described in this training manual the following documentation is additionally available:

#### ***Attention!***

***The currently valid part numbers for the documents can be taken from the Doclist or the Customer Service page in the BOMAG (BOMAG Secured Area) in accordance with the serial number of the machine.***

- 1. Operating and maintenance instructions**
- 2. Spare parts catalogue**
- 3. Wiring diagram \***
- 4. Hydraulic diagram \***
- 5. Repair instructions**
- 6. Service Information**

\* The document versions valid at the date of printing are part of this training manual.

## General

### **BOMAG ASPHALT MANAGER ( BAM )**

The increased demands concerning quantity and quality in the application and compaction of soils and rolled asphalt inevitably requires a permanent further development of vibratory rollers.

From the contractor's point of view a vibratory roller must fulfil three major requirements:

- efficient operation
- fulfilment of a task according to specification
- flexible use

Due to the inflexible parameterization, standard compaction systems are not able to adapt to the permanently changing construction conditions in an optimal way.

However, this problem can be solved by the introduction of intelligent compaction systems. The control values required for an automatic optimization of the compaction parameters are directly gained from the interaction between drum and material to be compacted.

BOMAG ASPHALT MANAGER is a compaction system, which improves the quality and reproducibility of compaction and enhances the efficiency of the roller, independently from the roller operator.

BOMAG ASPHALT MANAGER offers the user the following advantages:

- Automatic adaptation of the emitted compaction energy to the actual compaction status
- Uniform compaction and a much lower tendency for scuffing
- No jump operation and therefore no particle destruction or loosening of material
- The resulting direction of force is automatically adapted to the travel direction. This improves the surface quality of the material and reduces the slippage of the roller drums.
- Low vibration loads for driver and environment

After extensive testing and comparison trials the directed vibrator was chosen as exciter system, because it reaches a much higher compaction performance and a better depth effect.

**It meets the demands of many users for an "intelligent" roller with automatic adaptation of compaction.**

## Innovations

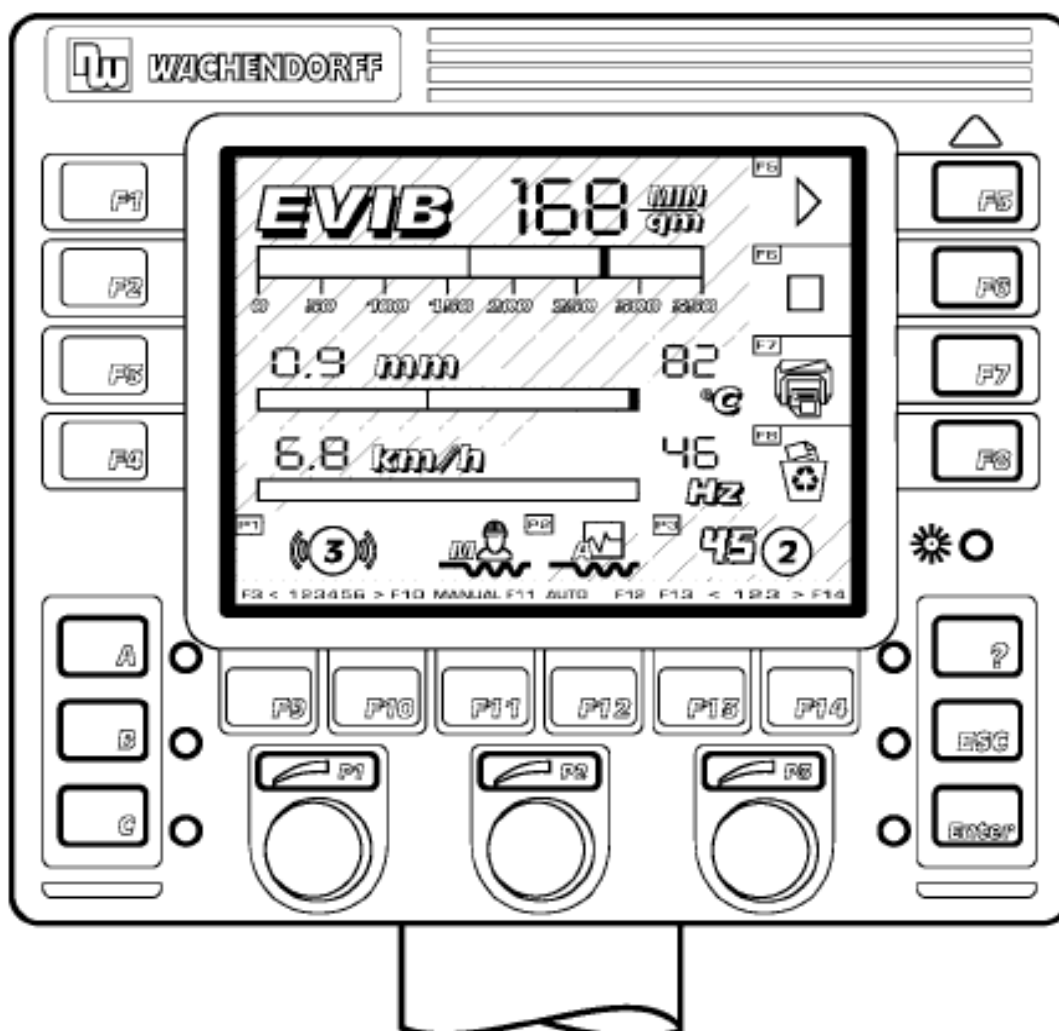
Part of the innovations achieved by further development is the new display and control element **BOP** (Bomag Operation Panel) used in combination with the measuring and control technology **BAM**.

Besides the display and complete operation of the measuring technology the BOP also enables simple fault diagnostics for the entire system.

Operation of the BOP is described in detail in the operating and maintenance instructions.

Error and input codes can be found on the page "Electrics" (BAM Service Training).

### BOP ----- Bomag Operation Panel



The **Asphalt Temperature Display** is indispensable in asphalt compaction!

The BOP in the direct field of vision of the driver





## **Description and function**

BOMAG already presented the Variomatic system in 1996. This system already enables the automatic adaptation of the compaction power to the requirements and does without the conventional manual pre-selection by the roller driver. In 2000 the automatic control technology was rounded off by another milestone in development, the Asphalt Manager. With this it was now possible to obtain a physical reference value Evib (MN / m<sup>2</sup>) for the increase in compaction, already during the compaction process.

## **Technical description**

The measurement of the ground contact force between drum and material to be compacted is accomplished by the two acceleration transducers on the drum, which monitor the dynamic behaviour continuously. The acceleration signals resulting from the dynamic interaction between drum body and ground are transmitted to the ESX-control.

Once certain limit conditions or setpoints are reached, the ESX-control sends a signal to the adjusting unit and the compaction energy is adapted to this new compaction status.

If the acceleration transducers signalize a lower soil stiffness, the vibrator system will swivel towards the vertical direction of vibration, until the maximum possible compaction energy is emitted. As the soil stiffness increases and certain limit values or setpoints are reached, the vibrator system will swivel back towards the horizontal direction of vibration, until falling short of the setpoints. This has the effect, that the BOMAG ASPHALT MANAGER system will always adapt the maximum possible compaction energy to the current state of compaction.

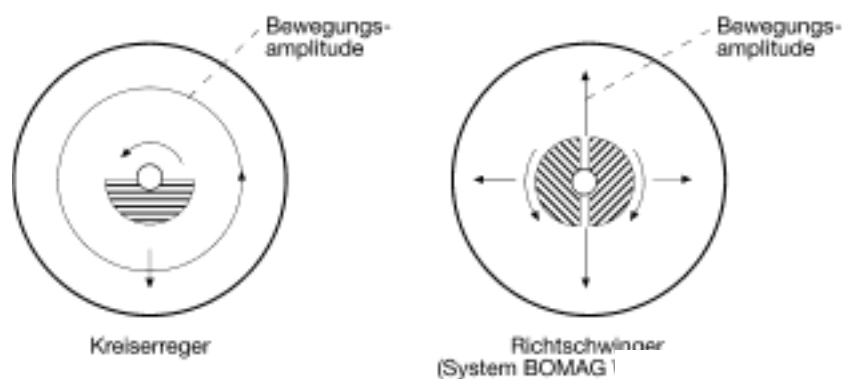
The roller operator is informed about these changes at any time, because his control and display unit, the BOMAG Operating Panel - BOP, is arranged optimally in his field of vision.

The processor –MESX, control of the Asphalt Managers, calculates the Evib-value (dynamic elasticity modulus), by evaluating the continuously measured acceleration values.

Due to his knowledge, or even better on the basis of the calibration to the corresponding asphalt mix, the roller operator recognizes the Evib orientation value.

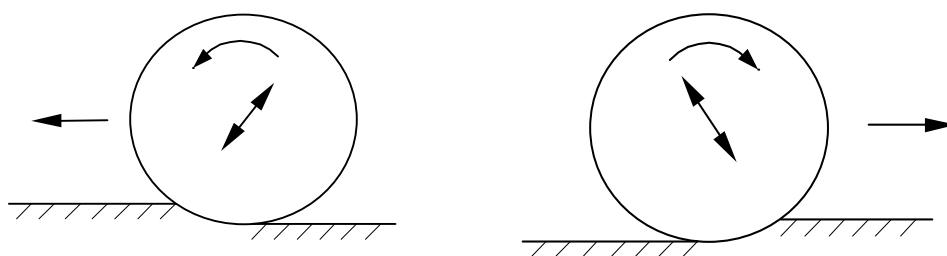
Due to the permanent display of the asphalt surface temperature the rollers with BAM always work in the hot zone, meaning 20-30 m behind the paver. This also boosts the efficiency of these rollers. An infrared temperature display is included in the standard equipment of the Asphalt Manager.

After extensive comparisons during the development of the VARIOMATIC system a decision was made in favour of the directed vibrator, because this type of exciter achieves a higher compaction performance and a better depth effect than circular exciters.



The use of directed vibrators in vibration sensitive areas, e.g. on bridges, is possible and produces excellent compaction results (horizontal vibration).

Adaptation of the direction of vibration to the travel direction



Adapting the vibration direction of the directed vibration to the travel direction produces an excellent surface flatness and reduces the tendency for scuffing and the formation of cracks. In asphalt compaction the asphalt is not pushed, but pulled under the drum. With a circular exciter the tendency for scuffing can be reduced by matching the sense of rotation of the eccentric weights to the travel direction, but this effect is only minor and hardly used in practice.