

A WIRTGEN GROUP COMPANY

 **VÖGELE**

VÖGELE BOOKLET ON PAVING



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WELCOME TO VÖGELE

Our Paving Guide has proved itself to be a practical source of information in every country where we have sales operations. For all of you who use our products and all those involved in the paving process, we have now updated both the content and appearance of this standard reference work to reflect the current state of the art. In the new edition, our team of experts focuses more specifically on the requirements of users and concentrates on the key fundamentals of asphalt paving.

The Paving Guide answers all the crucial questions relating to pavers, screeds, paving parameters, material science and special equipment. The whole process of asphalt paving is outlined clearly and comprehensively - because as we all know, quality is what you get when you consider every parameter from planning stage to completion of a construction project. The VÖGELE Paving Guide has been and will continue to be indispensable to every paving professional, apprentice and student involved in cutting-edge paver technology.

We are delighted to be supporting you on the journey!

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1.3 THE PRINCIPLE OF THE "FLOATING SCREED"

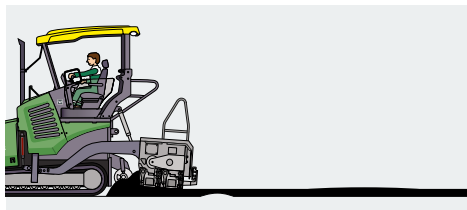
The floating screed of the road paver makes it markedly different from other construction machinery. It means that layer thickness is only changed via screed planing angle or screed tow point height, allowing irregularities to be reduced as they are travelled over without the need for intervention in the control system.



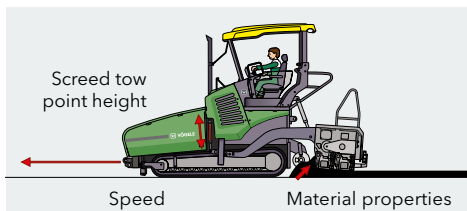
Brief irregularities in the sub-base are compensated by the self-levelling floating screed.



If extended irregularities are travelled over, the floating screed automatically changes screed tow point height and thus layer thickness.



Depending on the size of the screed planing angle, a corresponding amount of paving material will get under the screed as the paver moves forward, changing layer thickness evenly over an extended distance.

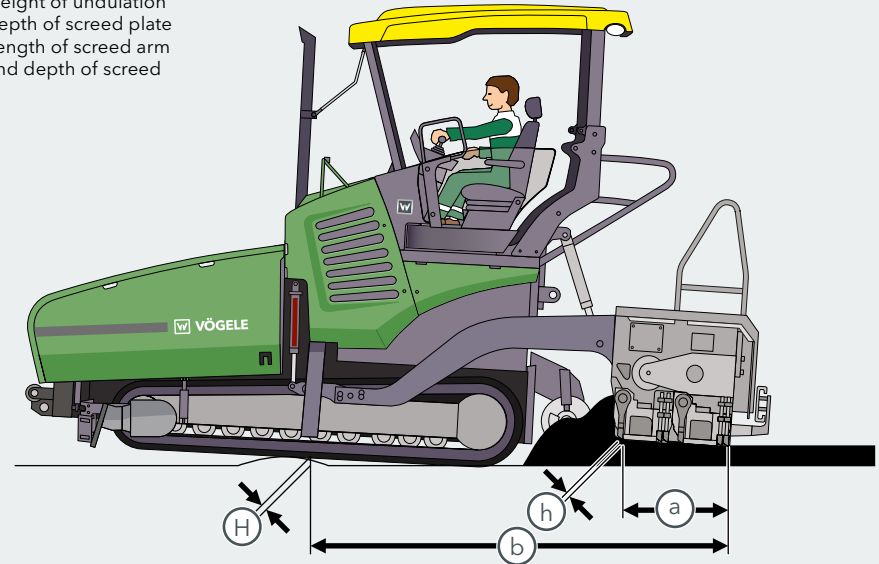


How the screed reacts to changes in the ground depends on

- > pave speed
- > change in screed tow point height
- > the properties of the material (ease of compaction, load-bearing capacity)

1.4 THEORETICAL OUTLINE OF THE "FLOATING SCREED" METHOD

h = Height after compensation
 H = Height of undulation
 a = Depth of screed plate
 b = Length of screed arm and depth of screed



The following principle can be derived from the example above showing a paver travelling over an undulation: when passing over a brief irregularity, length (b), which is a function of paver type and is made up of screed arm length and screed plate depth, delivers compensation of approx. 5:1. Extended irregularities can only be levelled by active control at the tow point rams.

$$h = \frac{H \times a}{b}$$

NOTE

The evenness must increase from bottom to top with each installation layer and depends on the layer being built over.

2.1 GENERAL DISTINCTIONS BETWEEN SCREEDS

The screed is the heart of the VÖGELE paving system. This is where the compacting systems work to ensure particularly compact and durable paving results. There are two designs of VÖGELE screed: Extending Screeds (AB) and Fixed-Width Screeds (SB). The screed, the paver's tool, has the job of compacting the material evenly across full pave width and thus of producing a sealed structure and an even surface. The compacting systems of the screed are intended to generate as much pre-compaction as possible so that different layer thicknesses have only a limited effect on the amount of subsequent compaction by rolling during final compaction.

EXTENDING SCREED

- ▣ The flexible screed which is usual these days
- ▣ Paving width is hydraulically adjustable without tools
- ▣ Huge range of applications
- ▣ Ideal for projects demanding variability and adaptability

Different systems are available for compaction.

The abbreviations for the compacting systems are as follows:

- T = tamper (an eccentric shaft sets the tamper into a vertical movement).
- V = vibrators (the vibration on the screed plate is generated by an unbalanced shaft transverse to the direction of travel).
- P = pressure bar (the pressure bar is forced onto the material hydraulically at a frequency of ~ 70 Hz and a pressure of max. 120 bar).
- P1 = version with one pressure bar.
- P2 = version with two pressure bars.

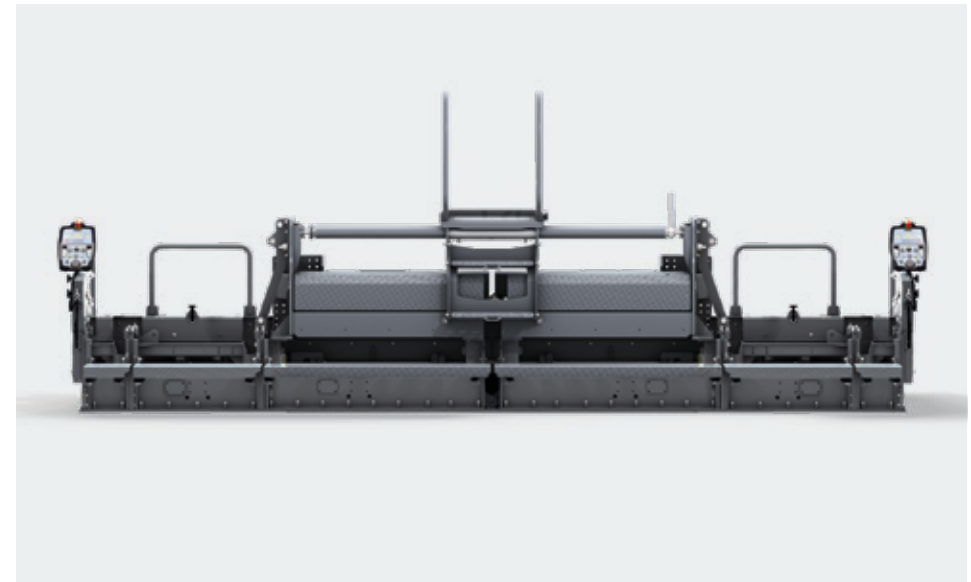
FIXED-WIDTH SCREED

- ▣ Large pave widths
- ▣ Optionally mountable, hydraulically extending elements deliver wide range of applications
- ▣ Excellent surface accuracy
- ▣ Suitable for paving processes with a high degree of compaction, such as water-bound base, RCC and PCC



EXTENDING SCREED

AB 600, pave width 6 m

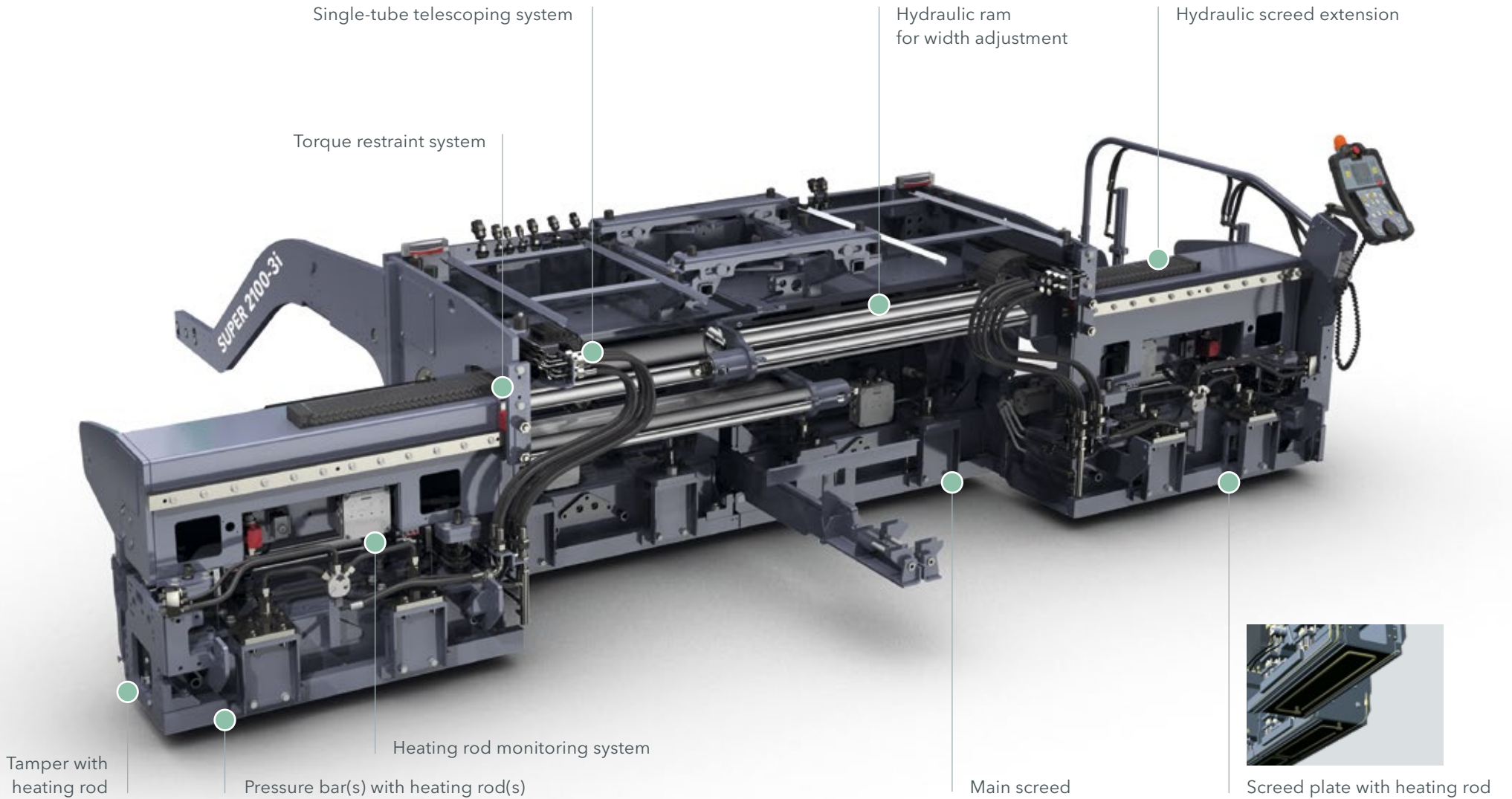


FIXED-WIDTH SCREED

SB 350, pave width 6 m

2.2 THE EXTENDING SCREED

2.2.1 ELEMENTS OF THE EXTENDING SCREED



4.1 BEFORE STARTING PAVING

4.1.1 BASICS

- ▶ Before starting work, determine minimum and maximum pave width and set up the paver accordingly.
- ▶ The paving sequence should be co-ordinated with other crews to guarantee material feed and stop hot material being driven over prematurely.
- ▶ The feed vehicles must be organized so that material can be supplied continuously with the minimum wait times possible.
- ▶ Check with your contact(s) at the mixing plant that the supply of material is secured as planned.
- ▶ Check the serviceability of the paver (fill levels, electric and hydraulic functions etc.).
- ▶ The tarpaulin placed over the hot material to stop it cooling down in the feed vehicle must only be removed shortly before tipping.



4.2 DURING THE PAVING PROCESS

4.2.7 TASKS OF THE PAVING CREW

OPERATORS OF MATERIAL FEEDERS

- Prepare the machine for every shift and clean it after every shift.
- Communicate with feed vehicle
- Operate the vehicle properly.
- Check hazard areas.
- Make sure material is discharged correctly (direction and level) from the conveyor into the material hopper of the paver.
- Do not overfill the material hopper and make sure material is discharging smoothly.
- Ensure the material feeder is being continuously filled.

PAVER OPERATORS

- Prepare the machine for every shift and clean it after every shift.
- Operate paver properly.
- Do not allow anyone in the hazard area of the paver.
Interrupt the paving process if necessary.
- Steer correctly to suit the project.
- Ensure the material hopper is being continuously filled.



- Pay attention to a correct head of material in front of the screed and to auger height.
- Keep an eye on the distance between the material feeder and the paver.
- Perform a regular visual inspection of the paved material behind the paver.
- Perform a regular visual inspection of the results of rolling (surface structure, evenness).

SCREED OPERATOR

- Prepare the machine for every shift and clean it after every shift.
- Operate the screed and make settings on the screed if necessary.
- Ensure the side plate is in the correct position.
- Ensure correct grade and slope control.
- Monitor screed planing angle and asphalt quality.
- Regularly check layer thickness with a folding rule or thickness gauge.
- Maintain specified pave width (by retracting and extending the screed as appropriate).
- Be aware of people and vehicles in the immediate hazard zone.

MONITORING (FOREMAN, PAVING SUPERVISOR, CONSTRUCTION MANAGER):

- Ensure material is delivered correctly (temperature, homogeneity, material specification, quality).
- Call off quantities of material from the mixing plant/reduce it or cancel it in the event of interruptions.
- Accept and check paperwork accompanying the material.
- Compare the quantity of material paved with that delivered.
- Plan and ensure smooth operations (from delivery of material to material feed to the work done by paver and screed operators).
- Ensure that all those involved behave in compliance with health and safety regulations and check on this constantly.
- Check the paving result behind the paver and behind the rollers and optimise if necessary.
- Evenness must be checked with a 4 m staff and a measuring wedge in accordance with specifications, both during paving and once the project is complete.

5.1 THE THREE KEY FACTORS IN PAVING

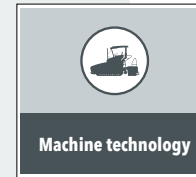


Construction companies have to guarantee that a road will be functional for a contractually specified period - and not just in Germany. Economical paving therefore assumes a long service life for the road. This will be assured primarily by paving in line with a reliable process in which quality is not a coincidence.

In order to achieve optimised paving of material, it is important before any construction project starts to begin by answering as fully as possible the fundamental questions relating to the three key factors for paving, namely machine technology, material and deployment of resources.

NOTE

If irregularities occur, a quick reaction is very important. Check whether it makes economic sense to continue working.



MACHINE TECHNOLOGY

- ▶ What pave width?
- ▶ What layer thickness?
- ▶ What type of paver and how many?
- ▶ What type of screed?
- ▶ Which screed version (hydraulic extensions, compacting system etc.)?
- ▶ What pave speed?
- ▶ What tamper speed?
- ▶ What pressure bar pressure?
- ▶ How is grade and slope control to be effected?



MATERIAL AND PREPARATION

- ▶ What is the quality of the sub-base?
- ▶ Which material is to be used (material composition, load class)?
- ▶ What grit size? (Consider ratio of layer thickness to largest grain size).
- ▶ How much material will be required/delivered per day/per hour?



DEPLOYMENT OF RESOURCES

- ▶ From how many plants is material to be ordered?
- ▶ How many trucks are to be used?
- ▶ How experienced is the paving team?
- ▶ Which rollers are required and how many?

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