WIRTGEN

Automatic 3D control system for SP 15 / SP 15i / SP 25 / SP 25i.

AutoPilot 2.0

AutoPilot 2.0 –
the innovative 3D control system

The use of standard 3D machine control systems for the production of poured-in-place concrete profiles using a slipform paver is often not commercially viable, especially for small contracting companies. This is mostly due to the high investment costs, the level of technical support required in day-to-day operation and the need to manage digital modeling data.

WIRTGEN provides customers with AutoPilot 2.0, an innovative and economical alternative system developed in-house which eliminates these exact drawbacks. The system is based on GNSS (Global Navigation Satellite System) and assists with the automated paving of a wide variety of offset and inset profiles, such as concrete safety barriers on motorways or curbs for traffic islands. It requires no more than the uninterrupted reception of signals from a sufficiently large number of satellites and proficient use of the system including the Field Rover prism pole.

Relevant points of the object to be paved are taught-in via a rugged tablet computer at the Field Rover using software developed in-house. These are then used to compute a virtual stringline which is optimized for the slipform paving process and incorporates local conditions. As opposed to conventional 3D systems, the digital data model is created right on the construction site. Once the tablet computer has been connected on the operator's platform of the paver, the specifications stored in the system can be run immediately without requiring any intermediate steps. The operator remains in full control, however, and can intervene in the autonomous paving process whenever necessary. Major advantage of the system: it dispenses with time-consuming surveying operations, the installation and removal of stringline or the preparation of a geodetic data model. AutoPilot 2.0 is available for the WIRTGEN SP 15, SP 15i, SP 25 and SP 25i slipform paver models.

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A	GNSS sensors to determine the machine's position and direction of travel
B	Intelligent software calculating curve algorithms
C	Biaxial slope sensor
D	GNSS reference station for real-time machine control
E	Total station for elevation control
F	Intuitive tablet computer for data input and system management

1 | *AutoPilot 2.0: detailed overview of the system.*

2 | *Stringless paving of poured-in-place profiles using AutoPilot 2.0.*

3 | *The Field Rover is used to teach-in the control points of the virtual stringline.*

4 | *The intuitive software installed on the tablet computer uses the measuring points to calculate the ideal course for the concrete paving operation.*

5 | *Even complex profile configurations can be created right on site and within a short period of time.*

2 |

E |

3 |

4 |

5 |

Rugged tablet computer
with easy-to-use software

The paver operator can easily create a virtual stringline right on site using the intuitive software installed on the rugged tablet computer. This can be realized by either importing previously created 3D models or measuring relevant points on the construction site using the Field Rover pole. Measuring on site additionally permits existing objects to be taken into account, such as storm drains, hydrants or lamp posts. The virtual stringline can then be adjusted to these objects as needed. The software includes intuitive tools for this purpose which are quite similar to those used when installing conventional stringline. After importing or creating the virtual stringline, the quality of the data created is verified automatically to ensure their suitability for the paving process.

The tablet computer is then connected to the intelligent machine control system of the slipform paver. Multiple sensors installed at the machine put the data created into immediate action. Graphics displayed in line with process requirements enable the machine operator to create, verify and pave even complex objects in no time at all via the tablet computer and slipform paver. Existing objects on the construction site are always incorporated in the process.
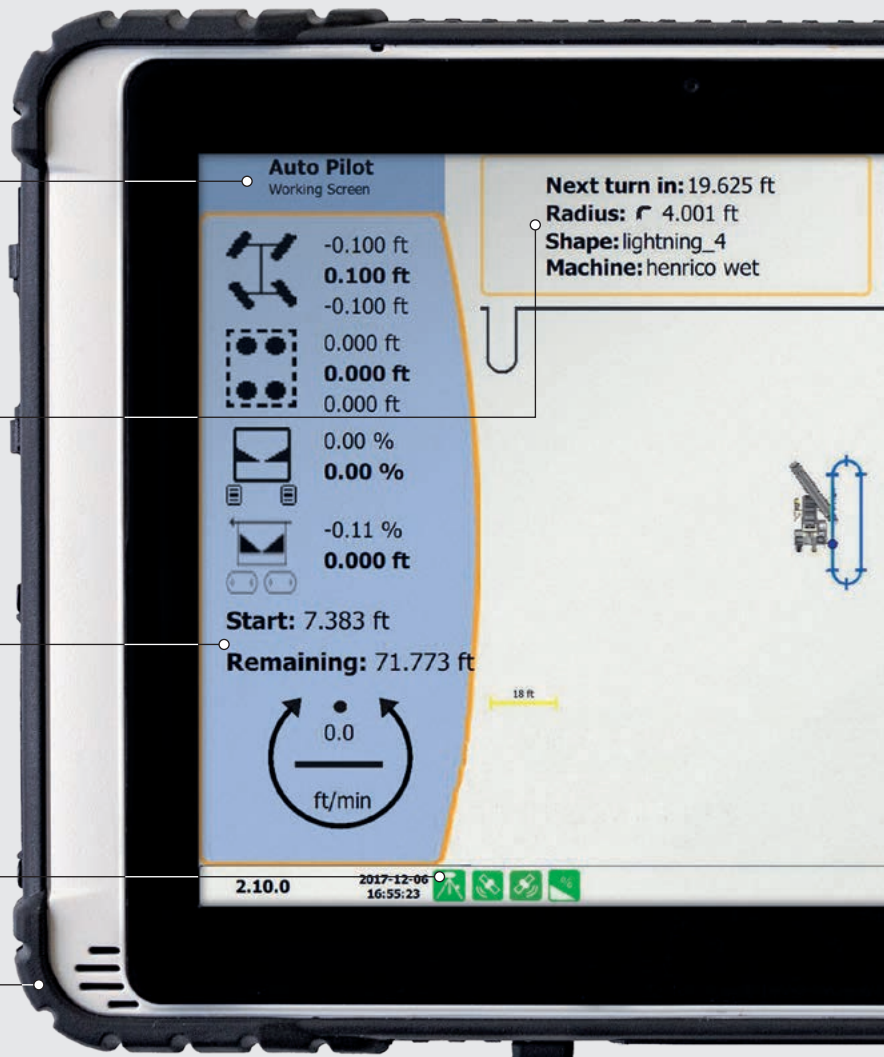
1 |

Info section providing all relevant information on the object to be paved

Preview of the next element including information on distance and radius

Overview of the completed section and of the section still to be completed

Current status information including event log and system details

Extremely rugged design for everyday use on site

Soft keys to adjust elevation
offset, steering offset or the
machine's angle of incline
during the paving operation

Soft key
steering offset

Soft key
elevation offset

Soft key
slope offset

Soft key
full view zoom-out

1 | *The tablet computer of the WIRTGEN AutoPilot 2.0 in detail.*

2 | *Following the successful creation and verification of a virtual stringline, the tablet computer is placed into the docking station on the operator's platform of the slipform paver.*

Highlights of the system

GRAPHICAL REPRESENTATION OF THE ENTIRE CONSTRUCTION SITE

The entire construction site including all objects is displayed in map view. The object to be paved is selected graphically by the paver operator. Each object can be viewed in detail by simple zooming and panning.

EXTENSIVE VERIFICATION OF IMPORTED DATA MODELS

The data are verified automatically for any sharp bends in steering control and sharp drops in elevation control to ensure maximum paving quality.

## DIRECT ERROR CORRECTION BY SMOOTHING OUT SHARP BENDS

The graphical editors can be used to remove any sharp bends in the model data quite easily and within an extremely short period of time. Similar to the installation of conventional stringline, this is achieved in that the operator inspects the sharp bend visually and then simply smooths it out by means of the editor.

DIRECT ERROR CORRECTION BY ADDING POINTS

The graphical elevation profile display enables any sharp drops to be smoothed out by adding points. The data can be just as easily adapted to existing objects on site which do frequently not fully conform to the original site design.
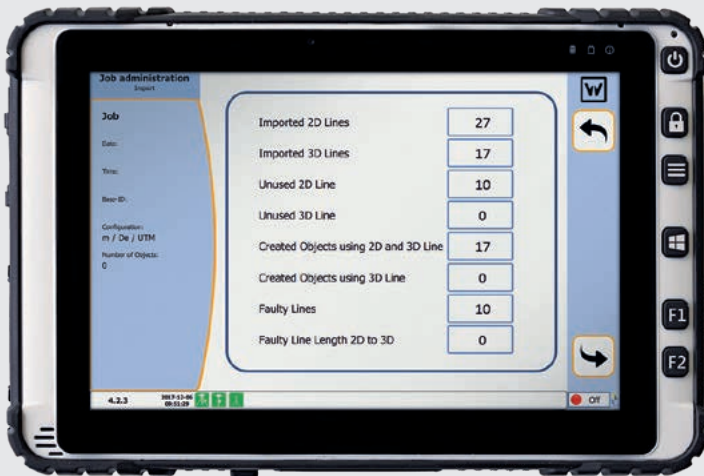
IMPORT OF EXTERNAL 3D DATA MODELS

External 3D data models can be imported fully automatically. In the process, the data are checked for plausibility in terms of the paving quality for the slipform paver.
A detailed report is displayed after the import has been completed.

DIRECT VERIFICATION OF EXISTING OBJECTS

Each object imported or created on the construction site can be verified quite easily using the Field Rover pole. This enables existing objects such as storm drains or hydrants to be checked for their correct positions inside the object.

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