

AUTOMATION AND SOFTWARE SOLUTIONS

AS1 CONTROL SYSTEM

CONTROL AND MANAGEMENT SYSTEMS
ASPHALT MIXING PLANTS



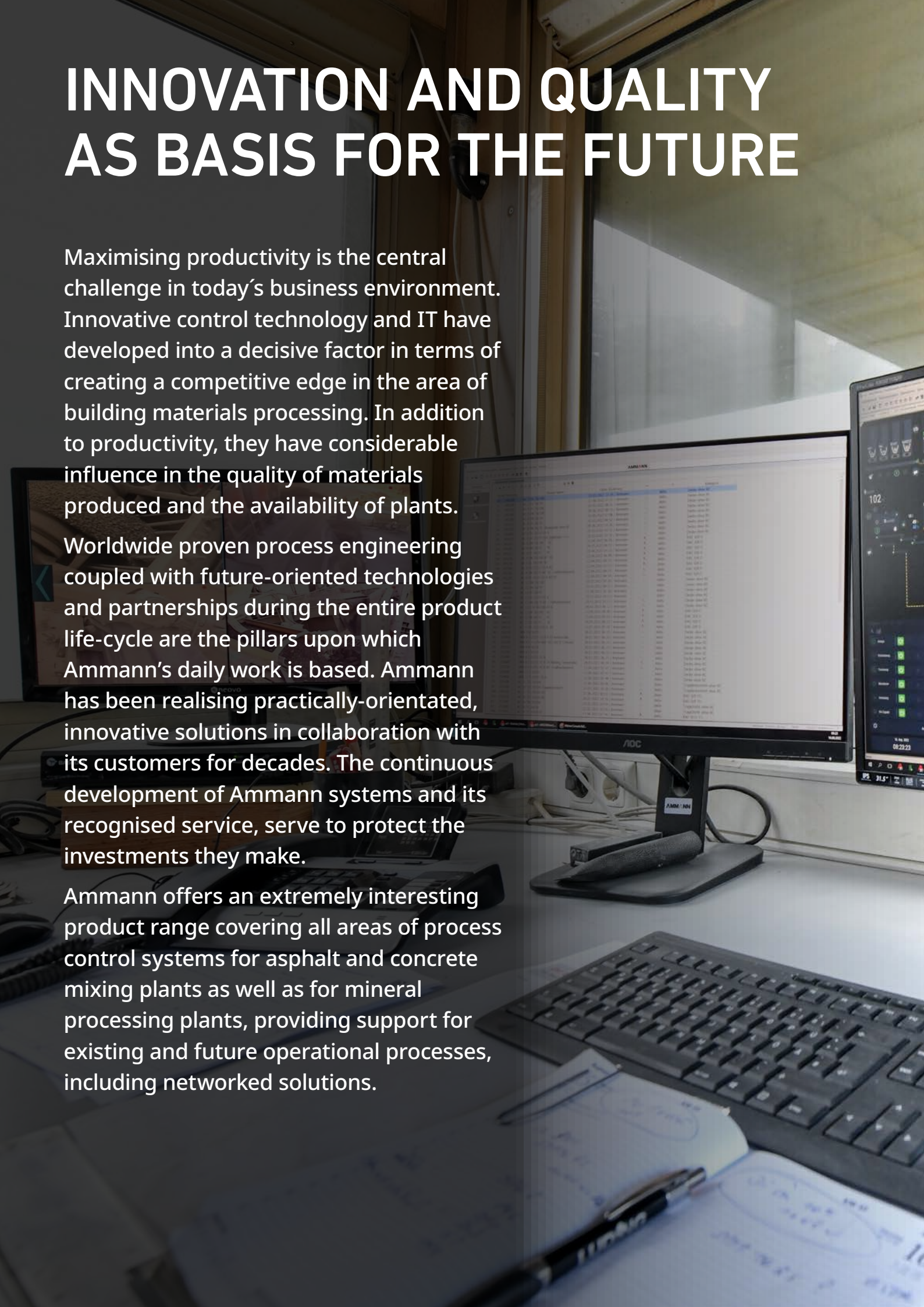
AMMANN

INNOVATION AND QUALITY AS BASIS FOR THE FUTURE

Maximising productivity is the central challenge in today's business environment. Innovative control technology and IT have developed into a decisive factor in terms of creating a competitive edge in the area of building materials processing. In addition to productivity, they have considerable influence in the quality of materials produced and the availability of plants.

Worldwide proven process engineering coupled with future-oriented technologies and partnerships during the entire product life-cycle are the pillars upon which Ammann's daily work is based. Ammann has been realising practically-orientated, innovative solutions in collaboration with its customers for decades. The continuous development of Ammann systems and its recognised service, serve to protect the investments they make.

Ammann offers an extremely interesting product range covering all areas of process control systems for asphalt and concrete mixing plants as well as for mineral processing plants, providing support for existing and future operational processes, including networked solutions.







AS1

CONTROL SYSTEM

The powerful and future-oriented as1 system concept combines proven Ammann software with specially matched industrial hardware.

The as1 computing environment has been designed and tested for use in tough environments. Its networking capability also has been optimised. Customers profit from the flexible workstation configuration, networking and administration.

THE FIELD BUS SYSTEM

Guarantees reliable signal transmission

The proven field bus system is robust and reliable under tough operation. Faults can be detected efficiently and rectified by means of the diagnostic tools, even via remote support.

THE POWER CABINET'S COMPONENTS

Designed for tough, round-the-clock operation

The power cabinet's components have to withstand extreme stress 24 hours a day, which is why Ammann only uses tried-and-tested, globally available quality components from renowned manufacturers.

HOTLINE AND SUPPORT

Plant availability assured

Electromechanical faults can be quickly resolved by the customer's own personnel with the help of the electrical circuit diagrams and the as1 diagnostic tools.

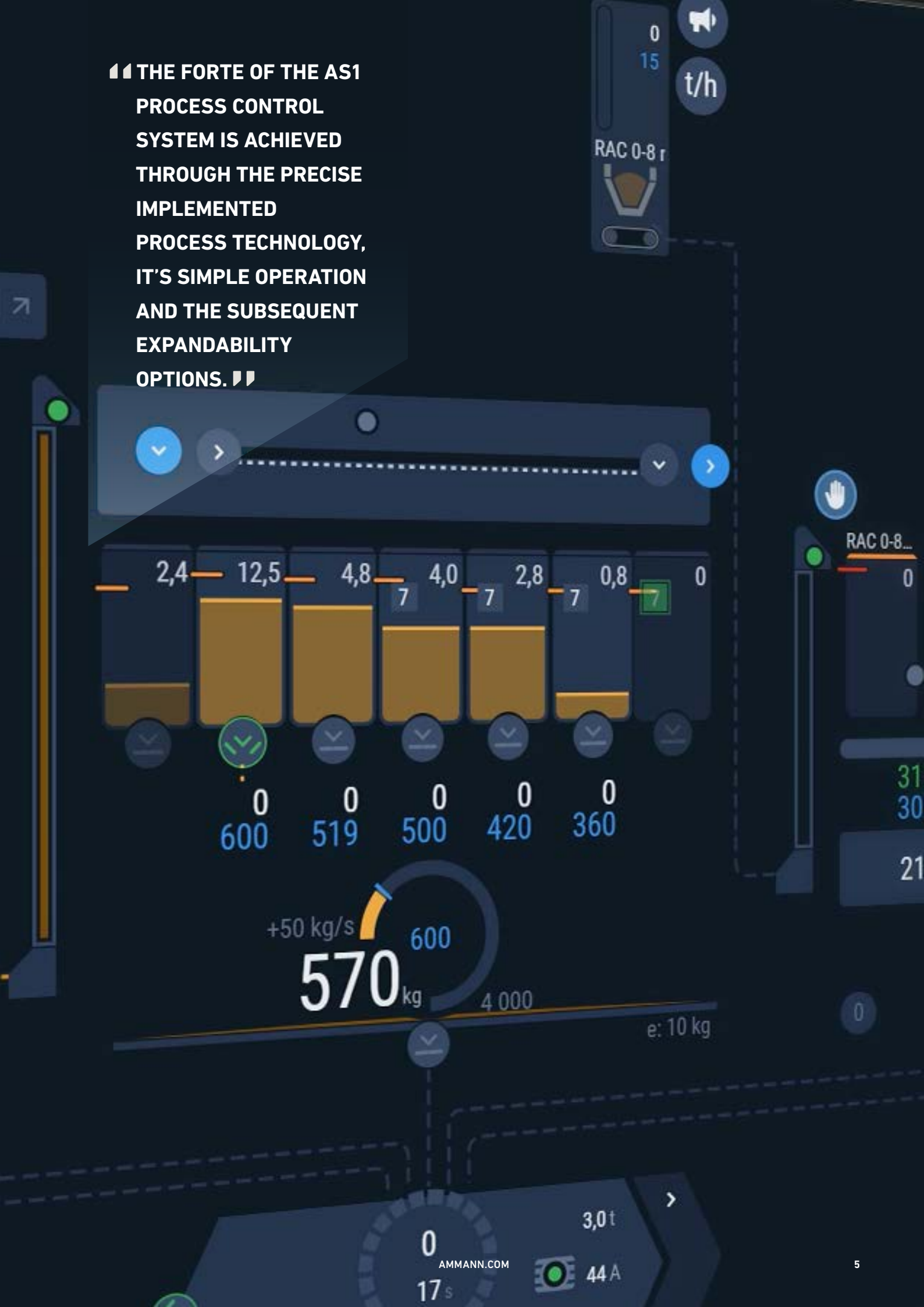
Ammann's knowledgeable customer service team staffs the hotline, which can be called for fault diagnosis or maintenance at any time. Modern telecommunications media increase the availability of the plant and reduce the need for costly on-site servicing.

HIGHLIGHTS

- Comprehensive system functionality;
- Quick and easy to learn;
- Safe to operate;
- Proven field bus and load sharing concept with highest reliability;
- Professional hotline and support organisation ready for service worldwide.

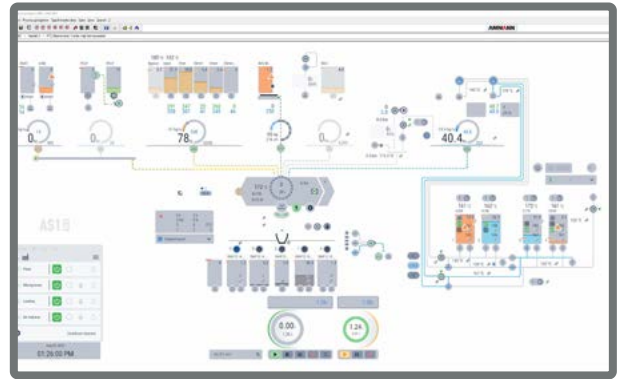
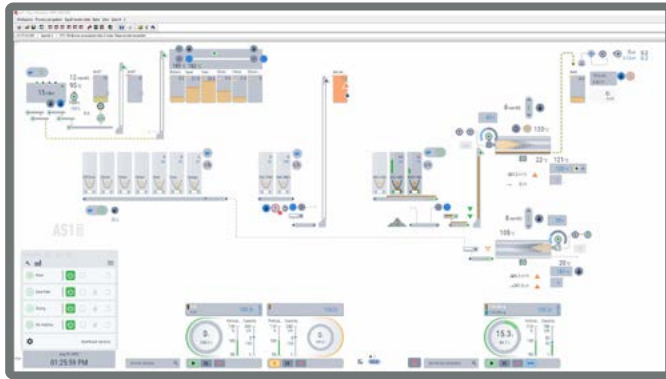


THE FORTE OF THE AS1
PROCESS CONTROL
SYSTEM IS ACHIEVED
THROUGH THE PRECISE
IMPLEMENTED
PROCESS TECHNOLOGY,
IT'S SIMPLE OPERATION
AND THE SUBSEQUENT
EXPANDABILITY
OPTIONS.

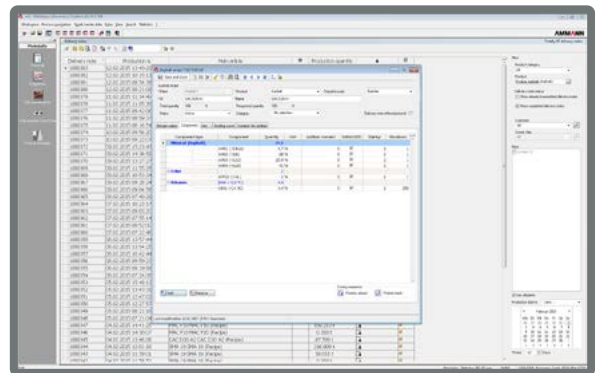
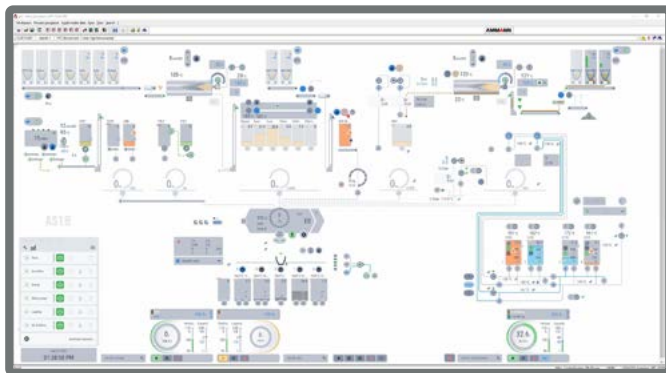


AS1 WORK PLACE CONFIGURATIONS

Split Process View



Overall Process View



AS1 FUNCTIONALITY AT A GLANCE

Comprehensive system with many useful tools for your daily tasks

Cold Feeding



- Unlimited number of cold feeding recipes;
- Graded start-up control system for creating an optimal material spread with automatic sand advance function;
- Composite or individual adjustment of the feeder proportions during running production;
- Assignment and selection of any number of materials incl. calibration curve per feeder;
- Combinable volumetric and gravimetric metering;
- Indication can be switched over per mouse click (proportions / capacity / quantity / speed);
- Calibration wizard for easy calibration (incl. linearization);
- Dynamic visualisation of material spread on the conveyor belts.

EXAMPLE FROM THE OPTIONS MENU

- Automatic conveyor belt drainage;
- Filling level measurement;
- Feeding of Bunker silos;
- 1/3 level measure and external signaling;
- Wheel loader terminal.



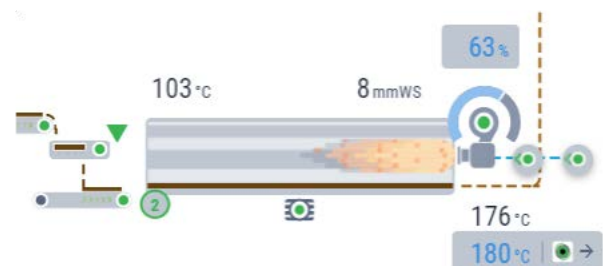
Drying and Dedusting



- Control all type of Burner manufacturer;
- Fully automatic burner step-up and step-down system (configurable);
- Automatic burner control for constant mineral temperatures;
- Automatic negative pressure regulation;
- Monitoring of material, raw gas and cleaned gas temperature;
- Material temperature trend visualisation;
- Burner diagnosis by means of trend visualisation and display of current automatic firing system status;
- Control all types of filter manufacturers;
- Dew point monitoring;
- Automatic filler compensation.

EXAMPLE FROM THE OPTIONS MENU

- Differential-pressure-related dedusting;
- Ammann Drying Expert (ADX) for the optimized burner regulation and constant aggregates temperature;
- Indication of fuel counters;
- Peak load indication gas (PLIg) with prognosis of fuel consumption per hour.



Weighing and mixing



- Production list for successive processing of several productions;
- Support various dosing systems;
- Dynamic inflight correction based on dynamic flow measurement for all components;
- Self-learning automatic correction of the inflight parameters;
- Automatic optimisation function for aggregate ratio to bitumen;
- Dynamic switch point from coarse to fine batching for small quantities;
- Automatic tare function of all weighing scales;
- Silo switching in the event of material lack during production
- Possibility for parallel dosing;
- Detailed logging and tolerance monitoring (configurable);
- Straightforward wizard for weighing scale calibration;
- Freely programmable mixing process (order of weighing / weighing scale discharge);
- Convenient direct selection of recipes via onscreen menu;
- Recipe change on the "fly";
- Automatic batch reduction during the warm-up phase;
- Multi-phase mixing system;
- Required quantity calculator.



Bitumen Tank Storage



- Full integration of electrically heated bitumen tank store (filling, circulation, transfer, mixing, evacuating);
- Temperature regulation;
- Display of temperature and content;
- Integrated, freely programmable timer for all heating's;
- Bitumen delivery monitoring and logging.

Loadout bins



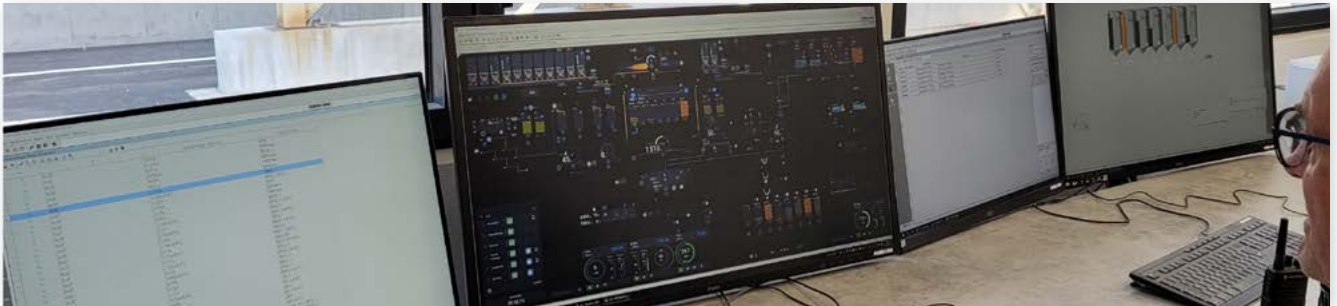
- Automatic loading bin control;
- Locking of silo loading based on bin content;
- Freely programmable switchover to subsequent bin in the event of full target bin;
- Integrated heating and display of load temperature.

EXAMPLE FROM THE OPTIONS MENU

- Balancing for the calculation of bin contents in combination with a weigh bridge.

Handling and Operation

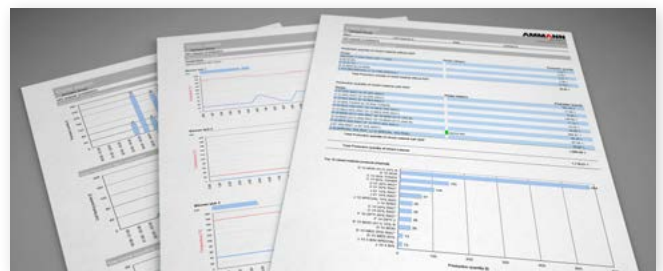
Fault diagnosis, service and Support



- Clear and intelligible visualisation of the plant status in real-time;
- Complete plant status available permanently at a glance;
- Fully automated mix production;
- Manual manipulation possible at any time;
- Various modes selectable (repair mode, manual mode, automatic mode);
- Upgradable to numerous workstations;
- Broad choice of operating languages available;
- Warning and error messages in clear text;
- Numerous object-oriented parameters for plant settings and optimisation;
- Integrated backup solution;
- Online operating manual.
- Plant optimisation, breakdown diagnosis and remote maintenance;
- Configurable trend diagrams for plant monitoring and optimisation;
- Integrated oscilloscope;
- Efficient troubleshooting by means of fieldbus diagnostic tools;
- Extensive event log;
- Object-oriented event counter (e.g. hours, throughput, starts, etc.);
- Failure protocol;
- Directly accessible wiring diagrams;
- Remote maintenance access and diagnosis via Internet;
- Automatic connection to the Ammann service platform and competent support through the Hotline Team.

Reporting

- Batch protocol and batch summary protocol (mixing tower / cold feeding);
- Production and component statistics;
- Capacity report (drying / mixing tower);
- Day report;
- Event counter report (operating hours, etc.);
- Operating unit report for straightforward plant documentation;
- Automatic PDF creation for Document Archive;
- Manual production data export for use with spreadsheet applications;
- Management summary report;
- Supervisor View.



EXAMPLE FROM THE OPTIONS MENU

- Graphical quality report;
- EcoView report;
- Messaging module (SMM) for automatic report transmission by email;
- Excel Addin for direct data access.

AS1 ADDITIONAL MODULES

The control system can do so much more:

as1 Wheel Loader Terminal (WLT)

Presents the essential information in the wheel loader

as1 Dynamic Recycling Addition (RAD)

Enables RAP ratio change during production with automatic recipe adaption

as1 Sample Planning (PSS)

Supports the planning of sample taking according to the EU standards

as1 Q-Report

Helps localizing causes of defect and to improve asphalt mix quality

as1 EcoView

Indicates how ecological the mixing plant is operated and shows trends

as1 Peak Load (PLM)

Helps preventing short term and expensive peak loads

as1 Photovoltaic Module (PVM)

Optimizes the use of solar power systems

as1 Loadout

Supports the automated loading and overload protection

as1 Traffic Control (TC)

Informs the driver where to go

as1 Weighing System

Integrates seamlessly the operation of truck scales into the as1 order planning system

as1 Integrated Maintenance Management (IMM)

Supports the staff with the planning of the required maintenance tasks

as1 Plant Information Point (PIP)

Provides online plant status information and production protocols

as1 System Messaging Module (SMM)

Automatically sends targeted information to the various stakeholders by email

as1 Excel AddIn

Provides various data sets for in-depth evaluations of as1 data in your Excel

as1 Data Interface

Data is required in various types and formats these days

as1 Wheel Loader Terminal (WLT)



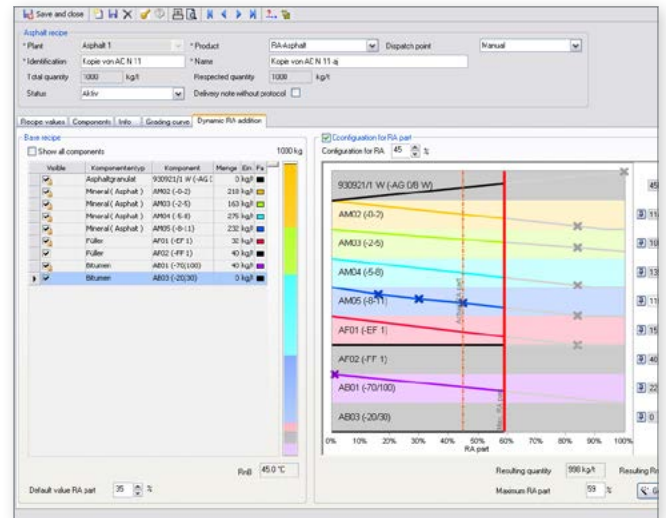
PRESENTS THE ESSENTIAL INFORMATION IN THE WHEEL LOADER

The Wheel Loader Driver directly sees all the essential information he needs for this daily business on the tablet mounted in the cabin. This reduces the need of communication with the plant operator to get information like which recipe is running at what capacity, which feeders are running or having lack of material.

HIGHLIGHTS

- Have cold feeding part in your view;
- See which recipe is running;
- See how much tonnage remaining;
- See errors in the feeding part;
- Dark and light theme available.

as1 Dynamic Recycling Addition (RAD)



VARIOUS RAP RATIOS IN A SINGLE RECIPE

Use of reclaimed asphalt protects natural resources and also offers economical advantages. The optional as1 module "dynamic RAP addition" makes it easy to modify the RAP ratio in accordance with requirements, even during production (batch plants).

TWO COMPENSATION OPTIONS

Quantitative compensation

The correction of virgin material is carried out in relation to the quantity and composition of the RAP material.

Qualitative compensation

The correction of virgin material is carried out in relation to the quantity and composition of the RAP material in accordance of Ring and Ball specifications (based on the formulas detailed in EN13108).

HIGHLIGHTS

- The integrated wizard guides operator through the recipe input process;
- One recipe is sufficient for numerous RAP ratios;
- Changing the RAP ratio by using the slide controls during production;
- For mix recipes as well as cold feeding recipes.

as1 Sample Planning – Certified Quality

Sample planning "M01" according to EN 13108-21 (Asphalt)

Planning for

*ID: M01 Name: Mike's Jobite sampling

Plant: Ammann

Recipe: 20 SI

*Requirement level: Z

Sample plan active: ☒

Conformity examination: Samples

Operating compliance level (OCL): Level A

Interval: Manual examination interval every 15 t or 2 per production week

Produced since last sample: 0 t Taken on: 01.10.2014

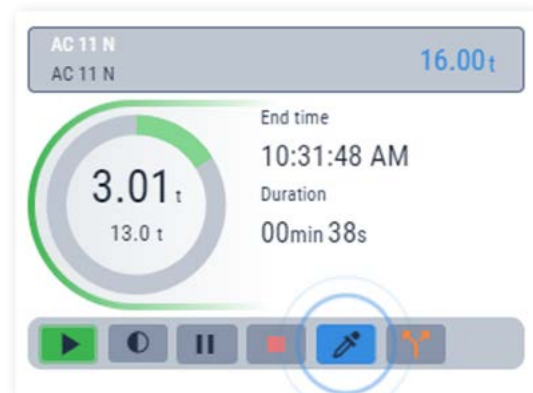
Difference until next sample: 15 t Latest by: 10.10.2014

Proofments

From the last 32 examinations 1 were non conforme

Sample ID	Take out time	Laboratory	Examiner	Conformity	Quantity since	Delivery
9	01.10.2014 16:04:09	TestLab	ComaSystem	✓	8 t	
12	01.10.2014 16:09:03	TestLab	Peter Lambert	✓	17 t	file:///C:/p

Details New Search

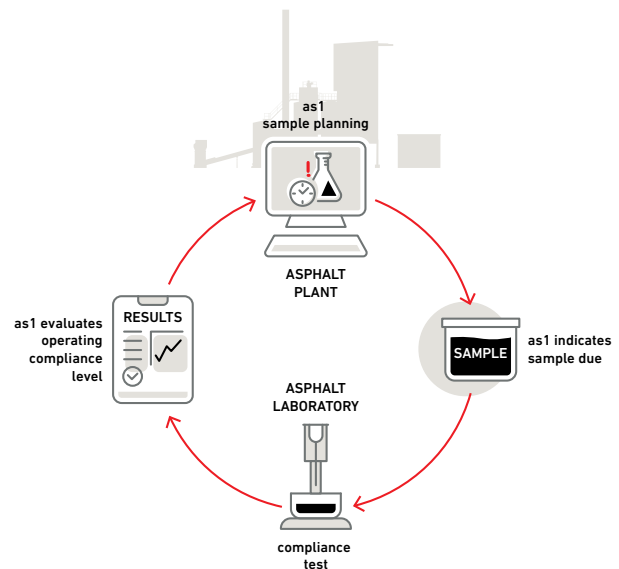


SAMPLE DUE?

The EN-13108.21 "factory production control" requires the monitoring of the mix quality by means of a comprehensive sampling plan. Based on the current operating compliance level, the operator is informed of a pending sampling and the required data record is created automatically. Thanks to the support by the software module, the operator is able to concentrate on his core tasks.

HIGHLIGHTS

- Allocation of recipes in classes;
- Display of the current operating compliance level;
- Notification of operator when sample pending;
- Automatic creation of laboratory order;
- Seamless documentation of conformity tests.



as1 Q-Report



IMMEDIATE QUALITY REPORT

This module provides a production quality report that indicates the mixed product quality by indicating the deviation of each component in each batch. This graphical report can evaluate a single production or multiple productions with the same recipe. It serves as a quality assessment based on the measured values and is available for review immediately after production without waiting for the laboratory analysis.

HIGHLIGHTS

- Evaluation of the production protocol data;
- Graphical report per component;
- Evaluation based on user defined quality standards.

as1 Ecoview



ENERGY EFFICIENCY MADE VISIBLE

The additional module EcoView shows how efficiently your operators are running the plant. The operating data is continuously recorded and presented in condensed form to the operator.

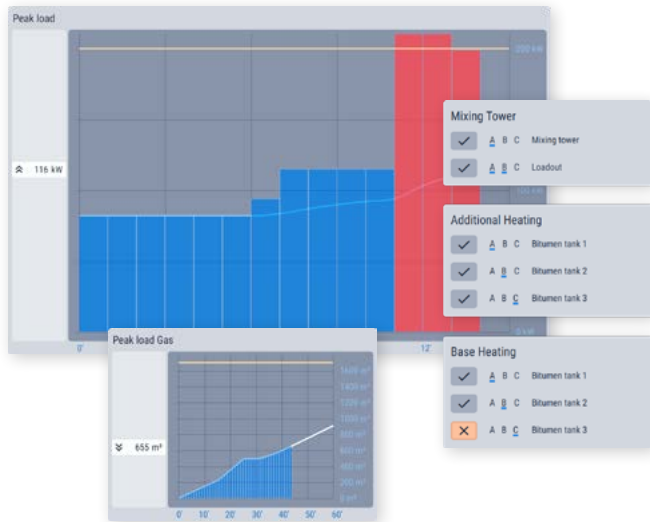
The EcoView module informs in a simple way about the energy consumption and the according CO₂ emission values related to ton of produced mixed material. With the display compared with historical data or with explicitly defined target values, trends and actions may be recognized.

EcoView sensitizes and promotes an energy optimised operation of the mixing plant and helps to discover and eliminate energy waste.

HIGHLIGHTS

- Intuitive operator display showing how efficient the plant runs;
- Displays key values and enables comparison to reference values and previous periods;
- Determines the emitted CO₂ values;
- Determines the resulting energy costs.

as1 Peak Load (PLM)



PEAK LOAD MANAGEMENT

For some energy media the energy price is based on price for work and price for capacity. For the latter, normally the measured peak is responsible for the tariff to be paid. It is in the interest of the plant operators / owners to keep the peak loads as low as possible.

The as1 Peak Load Management effectively supports the process by continuously monitoring the peak performance, against critical values and prediction of peak tariff timing, with the intent to reduce the peak load demand at the time of day that is most costly. In addition, the certain devices can be managed by stepping or automatic (ie: Heating) to be switched on/off, based on the consumers forecast of optimal high and low points in the tariff concession.

The as1 peak Load Management module fits seamlessly in the as1 eco modules and is available for the energy media electricity and gas.

HIGHLIGHTS

- Preventing short term and expensive electrical peak loads;
- Forecast function;
- Automatic switch off for electrical consumers.

as1 Photovoltaic Module (PVM)



SUPPORTS THE USE OF SOLAR ENERGY

The as1 Photovoltaic module optimizes the use of solar power on your plant. Based on the measured available solar energy and the plant electrical consumption, excess energy is conducted as heat into the available medium.

HIGHLIGHTS

- Indication of available solar energy;
- Prioritize the use of solar power;
- Supports the use of excess solar energy.

as1 Loadout



THE RIGHT LOAD IS IMPORTANT

The as1 Loadout module is the logical complement of the as1 production control system. The enlarged view of the loadout silos offers additional information such as time stamps of the last filling and take out, silo content (Quantity and Article) and last loaded quantity. The view comes either on the main screen, a second screen or optionally on a separate workstation for the truck loading operator.

HIGHLIGHTS

- Large display of the loadout silos on separate view with additional information;
- Efficient and safe loading creates cost advantages and satisfied customers;
- Increased safety thanks to integrated tare verification and overload protection of the vehicles;
- Automatic level calculation of the loadout silos.

as1 Traffic Control (TC)



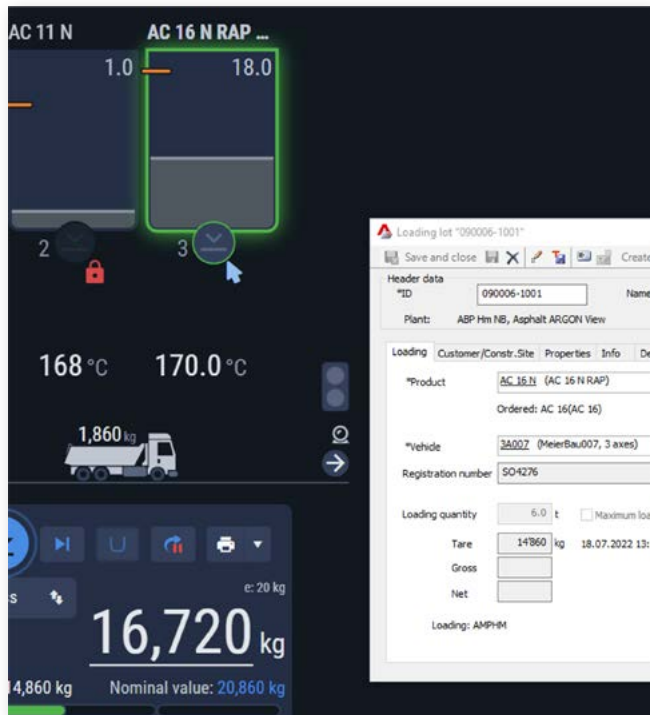
WHO IS NEXT

In addition, large alphanumeric displays for signaling the loading sequence can be integrated. In combination with loadout.

HIGHLIGHTS

- Less communication via radio;
- Automatic display of silo and truck information;
- No traffic jam before weigh bridge;
- Optimized process flow.

as1 Weighing System



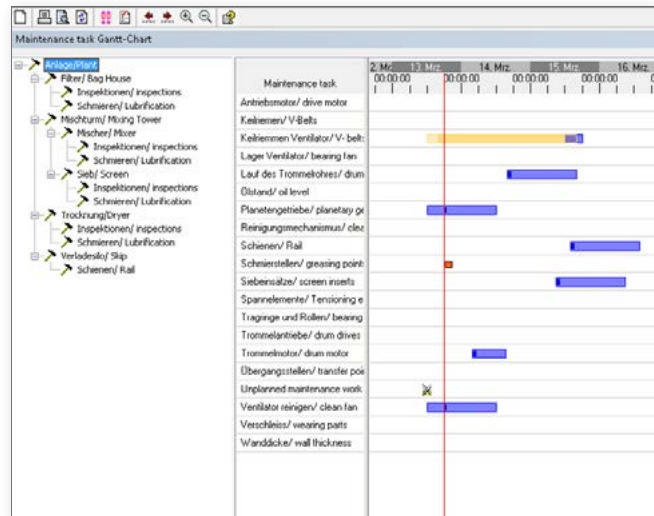
AUTOMATIC DELIVERY NOTE GENERATION

The as1 Truck Weighing System can be used to create weighing orders, weigh vehicles, and create delivery notes. The delivery note data can be transferred electronically into the invoicing system by means of data transfer, which reduces the amount of administrative work considerably. The Truck Weighing System can be operated as a stand-alone system or it can be combined with the as1 loadout system and integrated into an as1 process control system. This enables valuable synergies to be utilised.

HIGHLIGHTS

- Integrated master data handling;
- Direct delivery note creation;
- Integrated delivery statistics;
- Fully integrated with as1 control system;
- Reduction of administration costs thanks to electronic data transfer into the invoicing system;
- Overload protection in combination with as1 loadout system.

as1 Integrated Maintenance Management (IMM)



MAINTENANCE DUE?

The as1 IMM Module supports the staff with the planning of the required maintenance tasks of the mixing plant.

The module allows various maintenance tasks to be created and structured. Supported are maintenance tasks with fixed time schedules as well as event based tasks which are automatically planned based on the operating hours or the quantities processed on the plant. Store documents like work instructions or even short video clips to each single maintenance task.

HIGHLIGHTS

- Planning of cyclic maintenance tasks;
- Planning of event based maintenance tasks;
- Listing of the due maintenance tasks;
- Cost registration of the maintenance tasks;
- Assignment of detailed, multimedia work instructions.

as1 Plant Information Point (PIP)



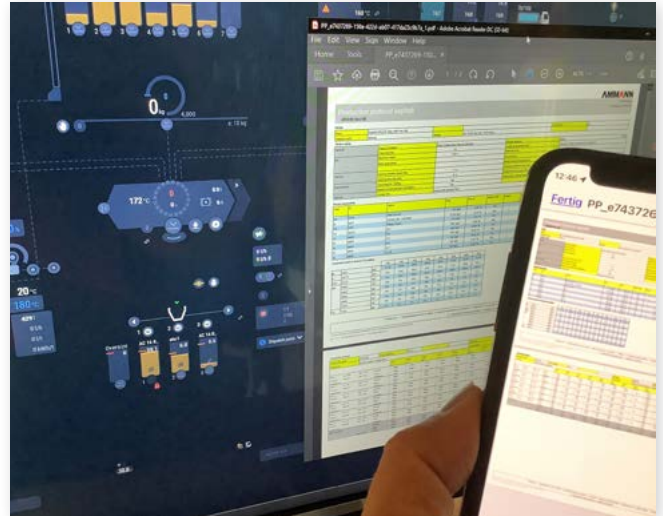
STAY IN TOUCH WITH YOUR PLANT

With the as1 PIP you are always having the latest status from the plant on your mobile device, without calling your staff or going to the plant. It gives you access to the production protocols right at the construction site.

HIGHLIGHTS

- Accessible via browser on desktop, tablet and smartphone;
- See important status information;
- Access to the production protocols.

as1 System Messaging Module (SMM)



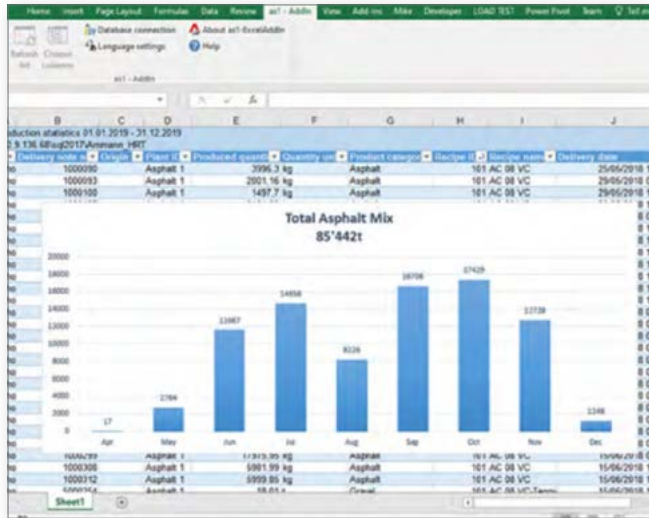
TARGETED INFO BY E-MAIL

The as1 Messaging module enables emails to be sent automatically from the as1 Control System to the various stakeholders by email. Three types of messages are possible: alarms, counter-events and PDF documents. Simply create a list of recipients and combine them in groups. The user selects which information is to be sent automatically – and to which group.

HIGHLIGHTS

- Keep important staff informed;
- Automatically send out E-mails;
- Define various recipient groups;
- Define schedules for transmission;
- 3 types of content available: alarms, counter events and reports.

as1 Excel AddIn



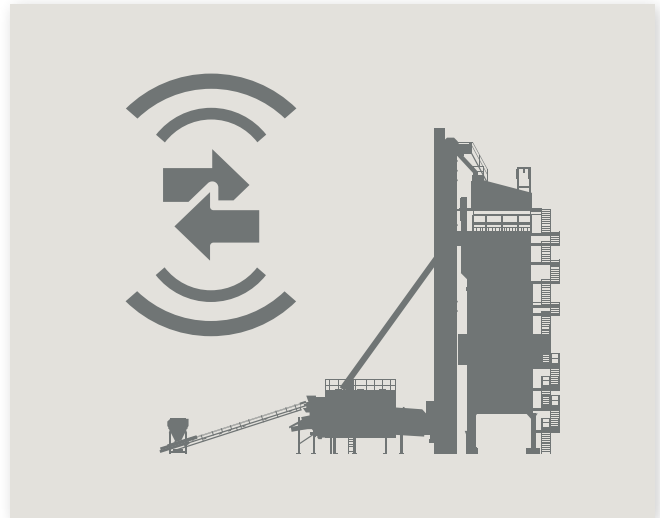
INDISPENSABLE FOR IN-DEPTH EVALUATIONS OF AS1 DATA IN EXCEL

Ammann offers an AddIn for Excel for comprehensive data evaluation, as an extension of the broad menu of as1 standard reports. This ingenious tool makes your Excel as1-capable. This enables defined data to be imported into Excel where it can then be processed just as you wish.

HIGHLIGHTS

- The requisite data can be selected from the comprehensive as1 data pool, imported into Excel and then evaluated;
- Newly generated data can be seamlessly integrated at any time with a click of the mouse;
- An effective tool for your individual evaluations in one trusted tool.

as1 Data Interface



GET CONNECTED

Data is required in various types and formats these days. Ammann offers a comprehensive data interface which leaves absolutely nothing to be desired.

HIGHLIGHTS

- For ERP, invoicing, laboratory systems, etc;
- Open XML file format;
- Operating and production data;
- Master data synchronisation (e.g. recipes, orders, products, etc.).

AS1 CLOUD SOLUTION

Mobile mixing plant management in the digital era

The Q Plant Agent software module connects the as1 to the Q Plant cloud solution from Q Point AG. This module allows transmission of production reports and statistics to the cloud in PDF format. The delivery notes are also transmitted from plants that utilise the as1 order processing or as1 weighing system. Selected production and operational data is transferred at the same time. This data is processed in accordance with requirements so it can then be viewed on the Q Plant website – at any time and from any location.



**BUSINESS
INTELLIGENCE**



**DOCUMENT
ARCHIVE**



**DEVICE
INDEPENDENT**



**ORDER
MANAGEMENT**



**PLATFORM
INDEPENDENT**

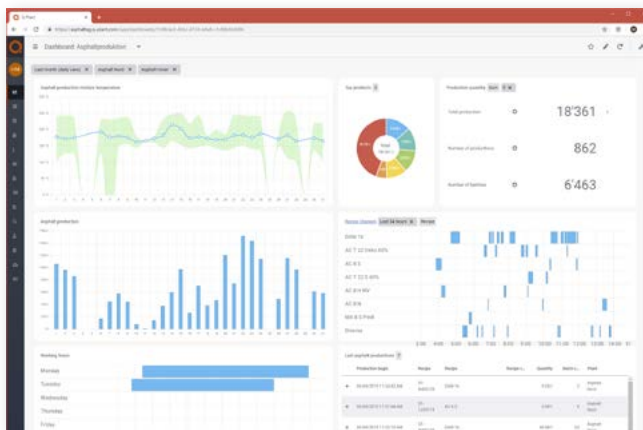
Q Plant makes it possible for plant operators to bundle the relevant information from their as1 Plant Control System, as1 Weighing System or as1 Order Processing System on a single platform. Q Plant links this information logically and makes it accessible in a simple and easily understandable format.

Depending on the configuration level of the as1, therefore, Q Plant makes critical information available at a glance (e.g. production and operational data, customer orders, delivery and production status for individual sites, etc.).

The PDF documents generated by the as1, such as production reports, component statistics and others, are available for further processing by simply pressing a button. Thanks to cutting-edge web technologies and future-oriented software architecture, Q Plant can be used on every terminal device with a compatible web browser – with no need to install an app.

HIGHLIGHTS

- Business intelligence (BI) with data evaluations;
- Dashboard with the main key values for plant and enterprise management;
- Needs-based, time-controlled generation of reports;
- Long-term archive for production reports or delivery note documentation;
- High level of data availability in the cloud;
- Interface with various third-party software products for site planning (Q Point).



Q Plant dashboard

Q Plant document archive

The use of Q Plant Agent requires a contract with Q Point. For availability and additional information, visit: www.q-point.com

AS1 RETROFIT CONTROL SYSTEMS

The bridge to the future

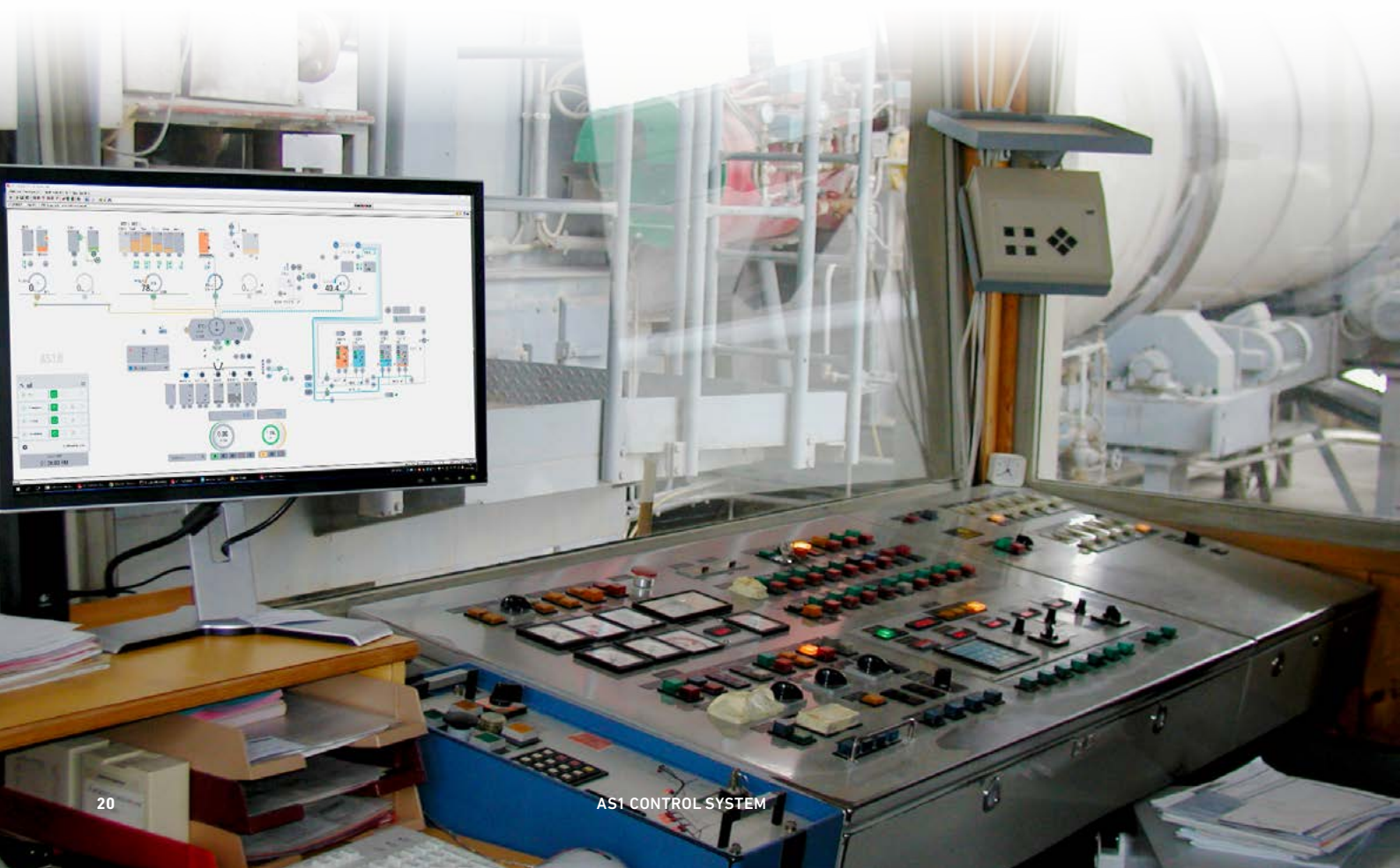
In many cases, technically overhauled plant control systems fail to meet current requirements in terms of spare parts availability, reliability, operating convenience and traceability of the manufactured products. Ammann understands precise customer requirements. Whether it be a partial or complete renewal of the entire process control system, Ammann offers comprehensive broad range of retrofitting packages. The large number of retrofit projects already undertaken on Ammann plants as well as thirdparty manufacturers serves to underline our expertise. Short retrofitting times, maximum adaptability, modular orientated- expansion options are core characteristics of the future Ammann as1 retrofitting concept.

INDIVIDUAL RETROFIT SOLUTION RIGHT SOLUTION FOR EVERY NEED

Ammann offers solutions for its own plants and plants from third-party manufacturers for retrofitting to modern Ammann as1 control systems.

HIGHLIGHTS

- The adaptability and modular format of the as1 makes it an outstanding choice for retrofitting all types of asphalt mixing plants;
- Easily comprehensible and fully graphical visualisation;
- Simple, easily learned and modern operation with mouse and keyboard;
- Qualitatively optimal batch production thanks to detailed process technology;
- Numerous statistics and evaluations for quality assurance;
- Remote maintenance via internet;
- Efficient service and support;
- Flexible and needs-related expansion possible at any time;
- Rapid retrofitting times thanks to pre-engineered interfaces.



Retrofitting kits for plants from Ammann and other brands

WEIGHING / MIXING RETROFITTING KITS

This retrofitting kit covers the automation for the area of weighing / mixing. Plant operators can economically equip their plants to fulfil requirements in the areas of production, statistics and quality assurance and are thereby ready for the future.

COMPLETE RETROFITS

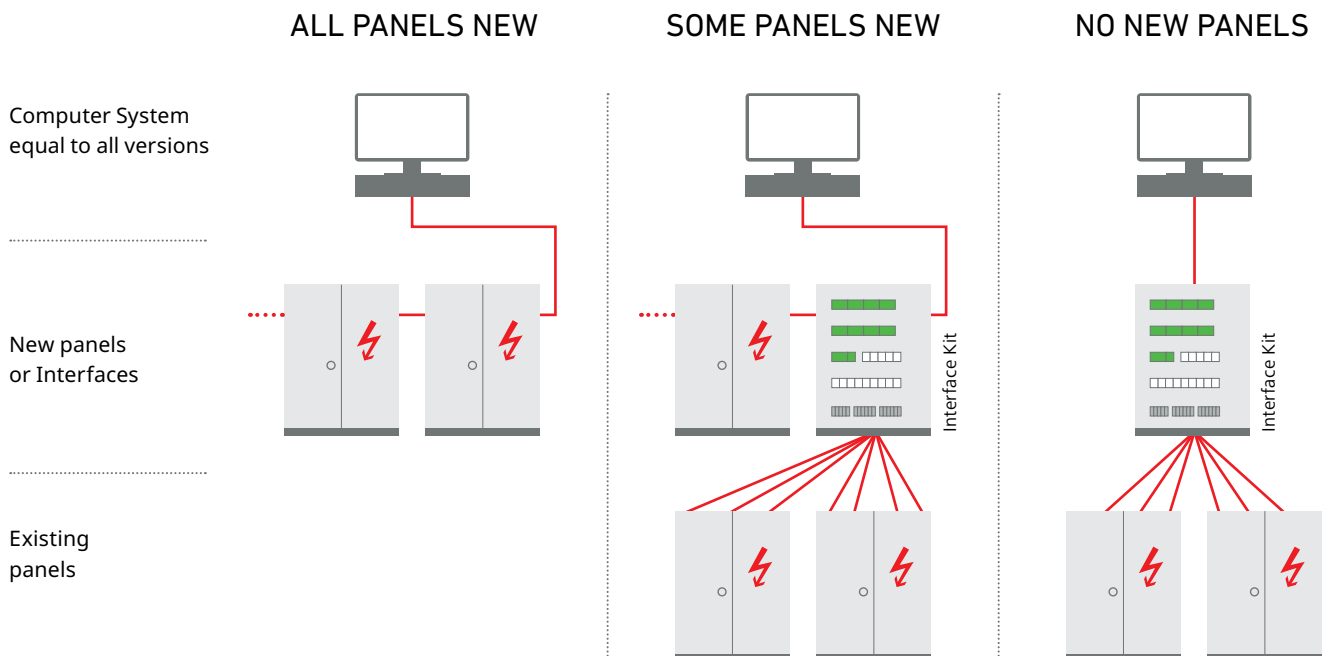
The adaptability and modularity of the as1 means that a suitable solution can be realised for any plant. Either a central interface cabinet or decentralised interface modules are used for installation in the existing switching cabinets, depending on the concept of the existing control system.

AMMANN RETROFITTING KITS: AS2000, AS2000PLUS, SIMTHESIS

Ammann AS2000, AS2000plus and SIMthesis control systems can be retrofitted quickly by means of minor adaptations to the fieldbus system and exchanging the computing environment. The smart solution for progressive operators.

RETROFIT VARIANTS

The reconstruction of the as1 control system retrofit kit can be done in three different ways. The volume of the retrofit it's up by the condition of the existing switch gear panel.



HOTLINE AND SUPPORT

Plant availability assured

Ammann experts are ready for you in emergency situations 24 hours a day, seven days a week. The help line team is highly trained and experienced. Representatives can talk you through the challenges – in many different languages. Remote connection to your control system or mobile camera sharing technology allow us to provide our customers the best quality support, that will facilitate the troubleshooting and as a result, reduce the downtime.

Electromechanical faults can be quickly resolved by the customer's own personnel with the help of the electrical circuit diagrams and the as1 diagnostic tools. Our hotline-experts can guide and help you with troubleshooting or maintenance of your Ammann Plant. Modern means of communication and built-in diagnostic tools increase the availability of the plant and reduce the need for costly on-site servicing.

INTERNATIONAL HOTLINE

- Experienced Hotline staff and use of modern communication media reduces response time and therefore plant downtime;
- The Hotline is available 24h a day and 7 days a week for emergencies;
- You talk to experts who knows your problems and have solutions ready;
- Our Hotline staff speaks several languages;
- The Ammann Hotline staff can connect to your Ammann plant control system via remote access for diagnosis and support;
- Our remote mobile camera sharing solution helps to see the problem with eyes of our customers.



TRAINING

Fullfil your plant's potential with training

Your plant features components engineered for productivity and technology that can deliver benefits unheard of just a few years ago. Yet those components and that technology are only as good as the operator using them. How can you help operators make the most of the tools at their disposal? The answer is training.

Ammann experts can customise a training program for your needs and work with operators and managers directly on your plant. The advantages include hands-on experience with your equipment and the ability to involve more of your staff than would likely be sent to a regional training center.

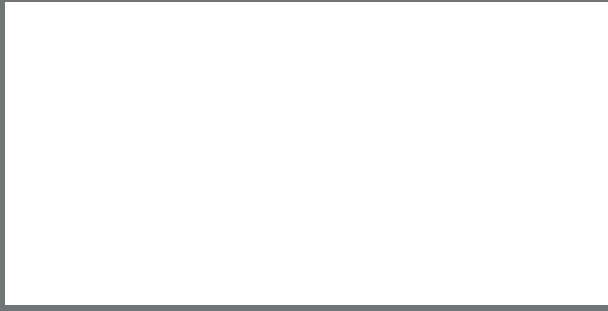
In addition, we offer online trainings specific for your plant and your staff using remote connection to your control system or with a plant control system on our simulator. Please contact your Ammann representative for more information.

WORLDWIDE TRAINING CENTRES

Ammann has more than 10 regional training centre locations around the world. Key training themes connect them all.

- A good balance. The centres combine a traditional classroom setting with hands-on experience, including the availability of plant components for maintenance lessons;
- Experiment without consequences. The as1 control system simulation provides operators with realistic scenarios without running the risk of wasting material or causing plant downtime. Operators can experiment and learn from their mistakes – without costly consequences to your operations;
- Learn from peers. Operators from other facilities attend the training. Participants say the conversations with their peers – and learning how they overcome challenges – is another key benefit;
- Learn in your language. Lessons are taught in many languages, ensuring your team understands key terms and lessons and makes the most of your investment.





For additional product information
and services please visit:
www.ammann.com

