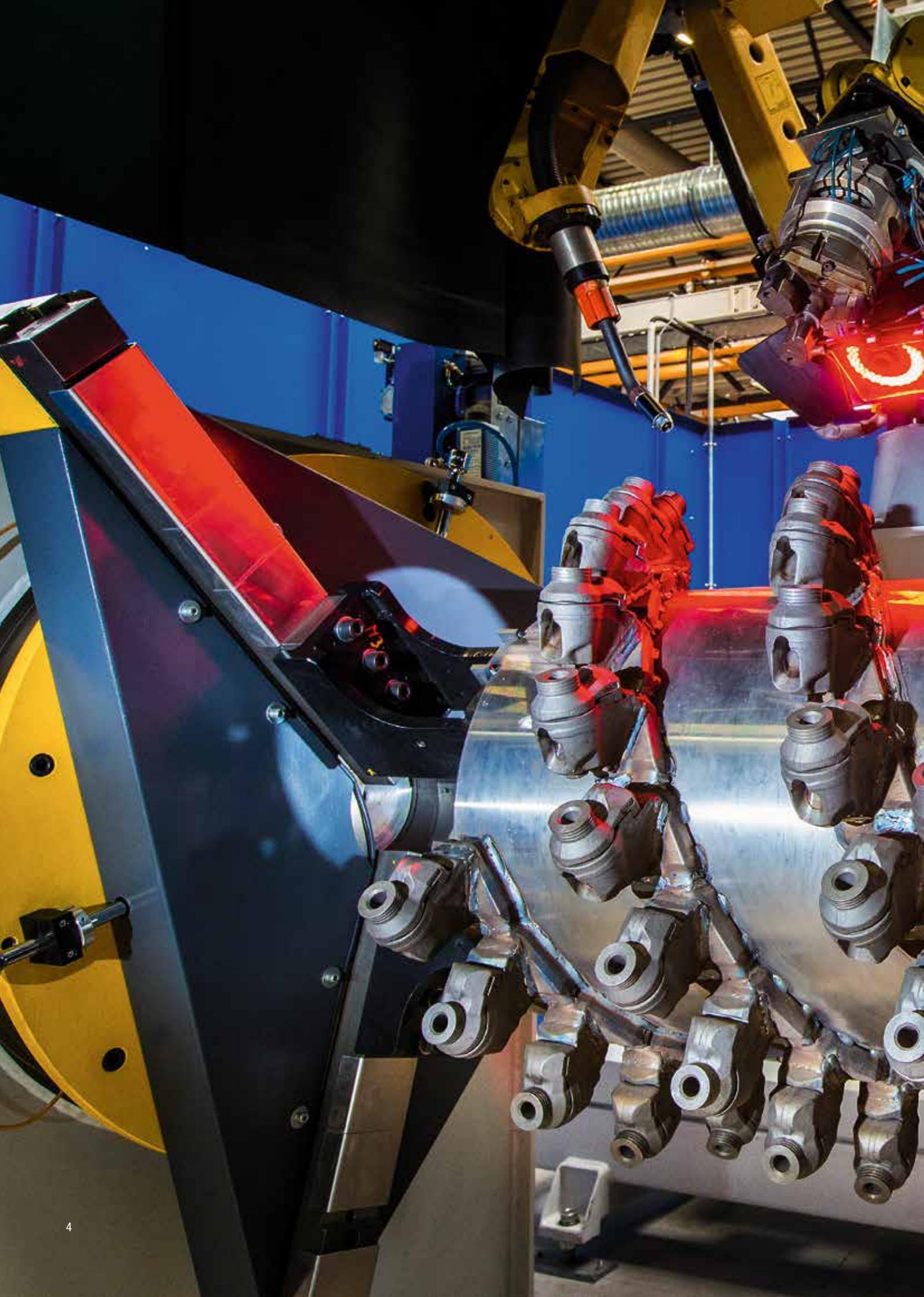




QUALITY MANAGEMENT MANUAL

QUALITY. THIS IS HOW WE DO IT.





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MILLIONS OF KILOMETRES BEAR OUR SIGNATURE.

We build the finest roads so we can all move forward faster. And to ensure that you can progress faster, we build the best machines. As a member of the leading international FAYAT group, we supply machines for all areas of road construction – from soil compactors to cold planers and recyclers, from asphalt rollers to road pavers. For over 60 years, the history of our company has been synonymous with the history of road construction.

With our accumulated know-how, we are an innovation driver that sets the pace for an entire industry. BOMAG has developed a huge number of technologies, from systems for measuring and controlling compaction through to technologies for reducing operating costs, such as the most effective screed heating

in the market. We offer solutions for a wide range of applications. Our global network of experts and partners in over 120 countries is there to support you, from the configuration of the machines to providing solutions for the most challenging of tasks.

We owe our innovative strength to our more than 2,500 employees worldwide, their commitment and their unique wealth of experience. A source of know-how which has propelled us to worldwide market leadership in this sector. The reason for this is our unconditional commitment to quality: in product development and production, in the qualification of our employees, and in a service that guarantees optimal on-site support.

BOMAG (CANADA), INC.
Mississauga, Ontario, Canada

BOMAG Americas, Inc.
Ridgeway SC, U.S.A.

**BOMAG MARINI Latin
America**
Cachoeirinha, Brazil

- Production site
- Sales company



HIGH QUALITY WORLDWIDE.

BOMAG represents quality. No matter whether our products are manufactured in China, the USA, Italy, Germany, or Brazil, the high quality standards demanded of our products are the same everywhere in the world. In order to achieve this quality the main plant in Boppard is responsible for permanently fulfilling customer requirements globally. Tried and tested procedures and standards are adapted in consideration of local and site-related factors and conveyed by Boppard to the other

subsidiaries. The local quality management systems (QM systems) are continually extended, and regularly monitored and improved. BOMAG in Boppard also serves as the central port of call for all quality-related issues, offering support where needed. Our aim has always been the same: namely, to ensure our high quality requirements for our customers worldwide.

SUCCESS THROUGH QUALITY.



BOMAG sets itself high quality standards. The ultimate company objective is to exceed customer expectations with our high quality products and services and work sustainably and profitably as a company.

The high quality of our products and services has been closely associated with the name BOMAG for years and is part and parcel of our corporate culture. It is the key to our market success and is directly linked to our pursuit of complete fulfilment of customer requirements.

The company management and managerial staff bear specific responsibility for reaching quality targets. They are committed to ensuring that the commonly developed procedures are applied universally at all levels throughout the company, and that each and every employee is aware of the needs and requirements of our customers. This responsibility cannot be delegated.

In order to fulfil and exceed customer expectations all of our employees are required to do their bit and gear the quality of their work to achieving customer satisfaction. This means actively working on achieving the demanded quality within the scope of their own line of special responsibility. This also applies to internal work procedures and means that each employee and department is both customer and supplier. Tight, organised communication of all involved is absolutely crucial for the objectives mentioned.

Jörg Unger
President

APPROVAL.

BOMAG GmbH Management has approved the Quality Management Manual (QMM) compiled according to the company's quality policy, and hereby declares it valid.

This QMM, based on the EN ISO 9001, describes the QM system implemented and practised at BOMAG GmbH, Boppard site. The documents quoted within the context of the QM system, as well as procedural, test and work instructions, are binding for all employees and departments.

The Management instructs all employees at all levels of the company to follow this QM system.

Jörg Unger, President

Boppard, September 2015

QUALITY POLICY

EVERYONE IS RIGHT BEHIND QUALITY.

As the global market leader in the field of compaction, road construction and road repair, we aim to constantly meet and exceed our customers' expectations when it comes to our products and services.

Top quality, technically sophisticated applications, short delivery times, and all this at reasonably priced conditions, ensure that this market position is reinforced and continuously improved to the satisfaction of all interested parties.



Ralf Junker
Managing Director



Dirk Woll
Vice President Finance & IT



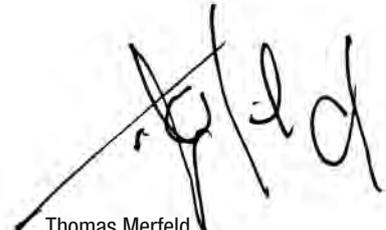
Marco Faulhaber
Vice President After Sales



Michael Grünewald
Vice President Sales



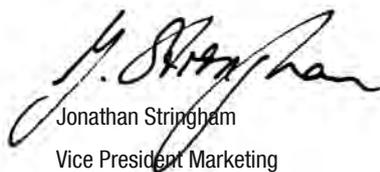
Robert Laux
Vice President Engineering



Thomas Merfeld
Vice President
Human Resources & Social System



Dr. Karl-Heinz Mölich
Vice President Business
Development & Legal



Jonathan Stringham
Vice President Marketing



Ludger Schaus
Head of Quality Management
Worldwide



Jörg Unger
President

QUALITY GUIDELINES

QUALITY IS OUR CORE OBJECTIVE.

QUALITY REQUIRES PLANNING.

More than ever before, top quality is a vital factor in keeping the competitive edge and permanently safeguarding the future of the company. It starts with good planning in that customer requirements are identified upfront and handled in internal processes.

QUALITY MEANS CONSTANT IMPROVEMENT.

Long-lasting quality can only be achieved if it is constantly going through a process of optimisation. The results and progress of our joint work require constant scrutinising, recording, measuring, documenting, and analysing in a regular cycle, and introducing and monitoring relevant measures to adapt them.

QUALITY REQUIRES COMMUNICATION.

Only the full and open exchange of information can prevent misunderstandings and mistakes. This is achieved by regular events, meetings and reports, and not just in individual teams, departments and hierarchy levels, but also across the board.

QUALITY MEANS DEPENDABLE DELIVERY AND RELIABILITY.

It is crucial that all assured services and deadlines both in and outside the company are upheld. Our customers judge us on this.

QUALITY MEANS REDUCING COSTS.

The goal for all of us is to prevent errors occurring; in other words, achieve the right result the first time round. Although this means employees should always bear the zero defects theory in mind, this is to be interpreted and understood as "consistently making fewer errors". This not only improves quality, but also reduces costs. Quality increases cost-effectiveness and ability to retain the competitive edge.

QUALITY CREATES A GOOD IMAGE.

Realising flawless product and work quality first is the crucial factor in ensuring that our customers, suppliers and the public associate BOMAG with the term "quality" without thinking twice. BOMAG has a good image that we need to take care of, maintain, and develop!





QUALITY REQUIRES TRANSPARENCY.

You can only improve what you can measure. Key figures collected from transparent processes serve as the objective basis for management decisions and are the prerequisite for rectifying faults and improving processes.

QUALITY NEEDS MANAGING.

There is no doubt that

- a cooperative management style
- the credibility of our own actions
- clearly defined targets, tasks and responsibilities, and
- clear orientation towards the expectations and requirements of both internal and external customers

make a considerable contribution to improving quality.

QUALITY REQUIRES CULTURE.

Quality can only be created long-term if it is part and parcel of corporate culture. Managers have to give the right answers: not only “if” something needs improvement, but also “what” and “how”. Quality has to be demonstrated.

QUALITY REQUIRES STRONG TEAMS.

A strong team is distinguished by the sense of partnership amongst its members. This requires openness both between departments and within the team, the courage to give and take constructive criticism, as well as the willingness to make a commitment to others.

QUALITY REQUIRES COMPETENT EMPLOYEES.

All company employees, whatever their jobs, contribute to the realisation of our quality objectives. They are required to employ all of their skills and expertise in the process. This makes it the task of each and every one of them to produce perfect quality in their work. If someone identifies a quality risk, this is remedied, or reported to the direct manager immediately.



QUALITY REQUIRES MOTIVATION.

Motivated employees are more efficient and aware of quality. A majorly important factor to success is motivation, which comes from taking pride in both their own work and the company. Once again managers need to provide the right environment for their employees.

QUALITY REQUIRES TRAINING.

Experience, training and education, and the level of knowledge of our employees make up the capital of our company. One of the managers' most important jobs is to constantly monitor and promote staff training, be it in a professional respect, in terms of processes, or in quality-related procedures.

QUALITY MUST RULE OUT FAULTS.

Our objective is always "zero defects". However, it is not just the defects themselves, but also the reasons behind them that have to be remedied. Defect prevention has priority over defect rectification – quality controls represent financial losses (or a 'waste of resources'). Process reliability comes with increasing command of the process, which means inspections can gradually be left out.



QUALITY NEEDS SUPPLIERS TO BE PARTNERS.

The quality of our products essentially depends on the quality of purchased parts, which is why we demand the highest quality from our suppliers. Support in implementing common quality objectives and agreement of a mutual quality management system result in quality assurance agreements. Long-term partnership is only made possible by quality, and both sides working on continuously improving procurement and the products.

QUALITY IS FUTURE-PROOF.

Quality means being better than the competition. Quality allows us to gain acceptance on the market and safeguard the efficiency and growth of our company. Systematic and continuous elimination of potential faults in our processes, and work and business operations, is the prerequisite for maintaining our competitive edge long-term and therefore safeguarding our jobs.

QUALITY NEEDS FEEDBACK.

Satisfied customers are the key to a company's success. Therefore, we need to know the customer requirements and expectations of our company's products and services, analyse the competition in our sector, and continuously work on improved solutions.

QUALITY MEANS SATISFIED CUSTOMERS!

QUALITY CREATES TRUST.

A QM system is the regular interaction of all departments for the benefit of the customer. Processes and responsibilities need to be defined and represented in an appropriate and comprehensible manner to achieve this. EN ISO 9001 provides us with a good instrument and can be used as a guideline for the implementation of our quality policy and quality objectives. A company with a QM system complying with a generally recognised standard profits from a certain confidence being placed in its ability to provide products and services which meet the requirements and expectations of customers. Moreover, a basis is created for process control, improvement of process capability and, ultimately, for improving the performance of the entire company. [VA-Q-010]

QM MANUAL (QMM).

The BOMAG QM system is presented in a general manner in this Quality Management Manual (QMM). It enables the communication of intentions and how measures interact. The basic structure is geared to business processes and subdivided into:

- Management processes
- Core processes
- Supporting processes

The QMM is available as a hard copy, but also as a file on the BOMAG intranet, like all other QM documentation. Only these documents published are valid. Further information, such as updating services, release, administration, etc., and the relevant standard chapters are also available on the intranet.

PROCEDURAL INSTRUCTIONS (VA).

The main requirements are set out in procedural instructions (VA). In the QMM, reference is made to the associated procedural instructions [VA-X-YYY] at the end of each section, if applicable. [VA-Q-001a]

In addition to the procedural instructions of the QM system, Controlling and Finance guidelines are currently still valid.

WORK AND TEST INSTRUCTIONS (AA, PA).

Written work and test instructions (AA and PA) have been drawn up as required to supplement and consolidate the contents of the VA; the employees concerned have been informed of these. They only apply in connection with a VA. [VA-Q-001b]

APPLICABLE DOCUMENTS (MGU).

Forms, lists, and records, etc., are called “applicable documents” (MGU).

QUALITY CREATES RELIABILITY.

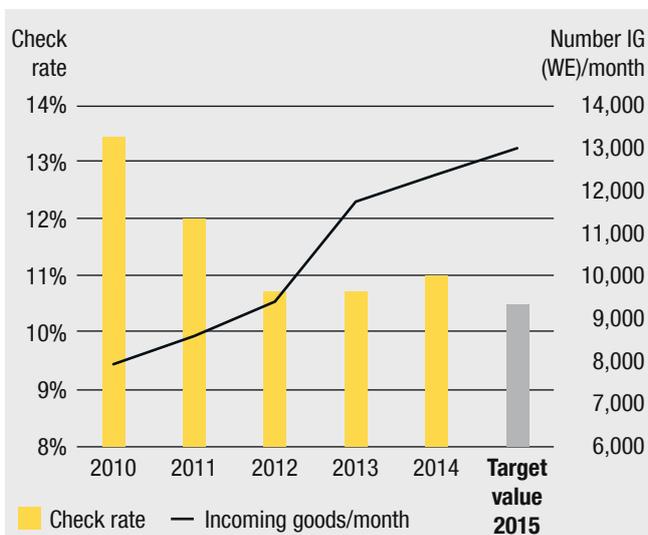


Responsibility and powers of authority are clearly documented in the respective job descriptions. Furthermore, other or additional definitions are provided within the QM system in the individual procedural instructions, sub-section “responsibilities”.

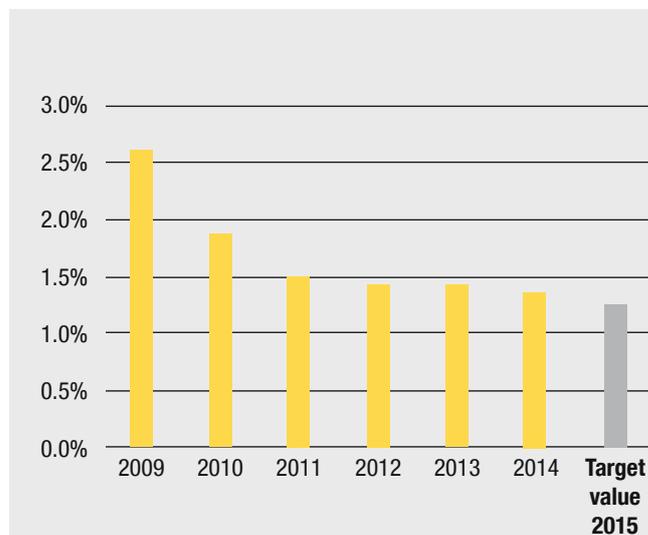
The Quality Management Representative (QMR) is an independent person with clearly defined powers of authority and responsibilities employed by executive management. This person primarily has to make sure that the requirements of EN ISO 9001 are implemented and observed throughout all business divisions and that Management receives regular reports regarding the efficiency of the QM system. [VA-Q-010]

The QM system is assessed in regular management meetings, which include the Service Manager and QMR. The pursuit and evaluation of objectives arising from the quality policy and initiatives, and the analyses of the current quality situation both internally and externally, are set out in a report which is distributed to Management and the managers concerned. Customer satisfaction, quality costs and the results of the internal audits are also standard subjects of the meetings.

The assessment criterion is the difference in each case between the current achievement of objectives and the target value.



Check rate of all incoming goods.



Quality costs in terms of net sales.

QUALITY THROUGH CONTROLLED PROCEDURES.

Any activity that turns inputs into results can be called a process. A required result can be achieved in a more efficient way if associated resources and activities are defined and controlled as one process. Often, the result of one process is the direct input for the next one. Linking of the processes and knowledge of their interaction are of utmost importance; this is called process orientation.

MANAGEMENT PROCESSES (MANAGE CORE PROCESSES).

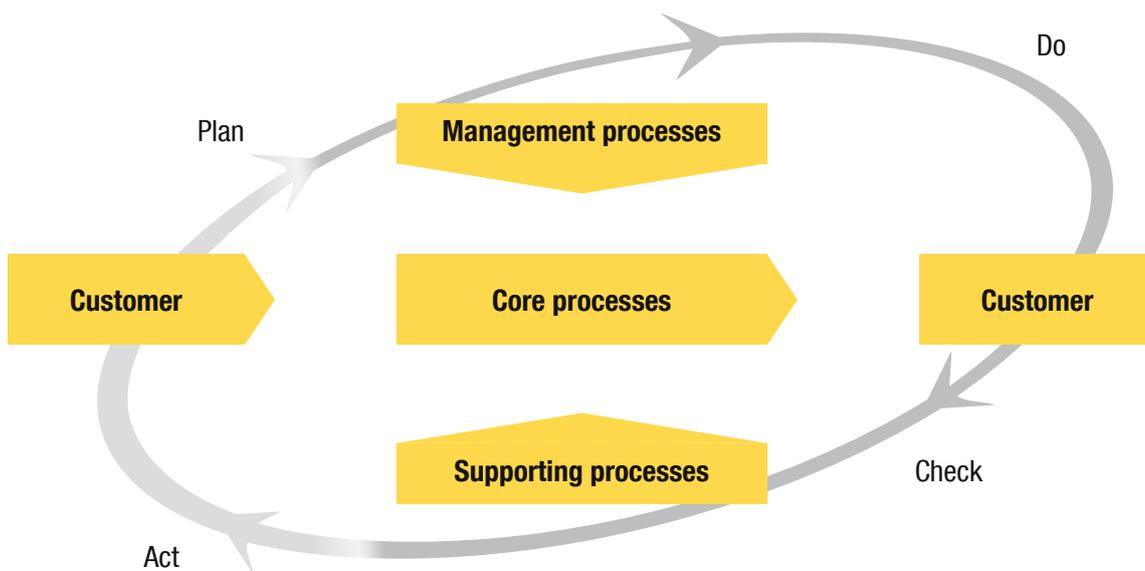
- Management of resources
- Monitoring, analysing and measuring
- Continuous improvement

CORE PROCESSES (YIELD PERFORMANCE).

- Account management
- Product development
- Procurement and supplier management
- Product realisation

SUPPORTING PROCESSES (SUPPORT CORE PROCESSES).

- Control of documents
- Control of records
- Preventive maintenance



Process orientation at BOMAG.



EFFECTIVE PLANNING GUARANTEES TOP QUALITY.

The resources necessary to implement, maintain and continuously improve our QM system are determined by means of market observance, customer requirements, and constant adjustment to the progress of technological development, as well as monitoring of internal processes and products.

PROVISION OF MEANS.

Once a year, heads of departments plan their budgets, including investments. The planned and appropriate means for all activities are provided and monitored in all process stages.

HUMAN RESOURCES.

Steps are taken to ensure that all employees who influence the quality of the products are suitably qualified and have the required skills and experience. Every manager is obliged to find out if the existing skills are lacking in any way in terms of those required and to announce training and further education programmes. The entire organisation of all training programmes is the responsibility of the Head of HR. [VA-HR-001, VA-HR-002, VA-HR-003]

INFRASTRUCTURE.

To ensure processes run smoothly the necessity of infrastructure measures is determined for the product in question and measures are then taken. This includes buildings, workplaces, facilities, roads, warehouses and parking areas.

KNOWLEDGE AND INFORMATION.

At BOMAG, consistent knowledge management is practised in order to organise, control and develop the organisational knowledge base; in particular, this includes the creation of an infrastructural and organisational prerequisite, e.g. in the form of a BOMAG Wiki.

WORKING ENVIRONMENT AND ENVIRONMENTAL PROTECTION.

The working environment necessary to achieve compliant product requirements, occupational safety and employee motivation is determined, provided and maintained. [VA-HR-004, VA-HR-005]

ORDER AND CLEANLINESS.

High-quality products can only be manufactured in a tidy and clean environment. All workplaces and stations are therefore kept tidy to achieve compliance with the relevant product requirements. Workers, managers, and the person in charge of building matters are responsible for this.

YOU CAN ONLY IMPROVE WHAT YOU CAN MEASURE.



CUSTOMER SATISFACTION.

At BOMAG, it is all about our customers. In fact, our top priority is their constant satisfaction. Sales and Management ascertain facts, moods and trends which are then compared to our competition and reputable mechanical engineering companies. The most varied of methods are applied, ranging from statistical analyses and phone surveys to regular visits. The results are recorded in reports and action plans, which are implemented immediately; these form the basis for assessing our competitive edge.

INTERNAL AUDITS.

Audits involve surveys of departments and individual employees by staff trained for this purpose in order to determine if our QM system fulfils, effectively implements, and maintains the defined standard requirements. The key points are as follows:

- Planning the audit
- Performing the audit on site
- Analysing and discussing the audit
- If necessary, taking corrective action and monitoring
- Reporting

In process audits, we check whether the processes defined in the procedural instructions are capable of achieving the planned results. Under the supervision of Quality Management, we regularly take a finished machine directly before it is shipped and perform a product audit. In cooperation with all relevant departments, it is tested and assessed and the results are logged and distributed.

All new suppliers are subjected to a supplier audit before being allowed to make a sample delivery. [VA-Q-008a, VA-Q-008b, VA-Q-008c]

DATA ANALYSIS.

The entire QM system is based on figures, data, facts, analyses, statistics and trends. They form the basis for effective decisions and continuous improvement in the form of corrective and preventive measures. Management acquires significant findings about the efficiency of the QM system from the results of the internal audits and uses it in their regular assessments.

STANDING STILL MEANS FALLING BEHIND.

The “continuous improvement” required not only by set standards, but also by us, refers to the efficiency and performance of the QM system and its processes to ensure products that meet customer requirements. The results of the relevant processes are regularly presented in the “Quality Review” and are subjected to a continuous improvement process (KVP). In addition to constant examination of team reports and action plans, there are many different procedures to actually implement the improvement process. By way of example, the following cites Blean and the company suggestions scheme, which also includes preventive and corrective measures. [VA-Q-027]

COMPANY SUGGESTIONS SCHEME.

The company suggestions scheme aims to provide the impetus to constantly improve efficiency in terms of the interaction of people, technology and the organisation. This allows us to achieve a higher level of job satisfaction and a significant contribution to the continuous improvement of our processes, whilst strengthening BOMAG’s competitive position. [VA-Q-011]

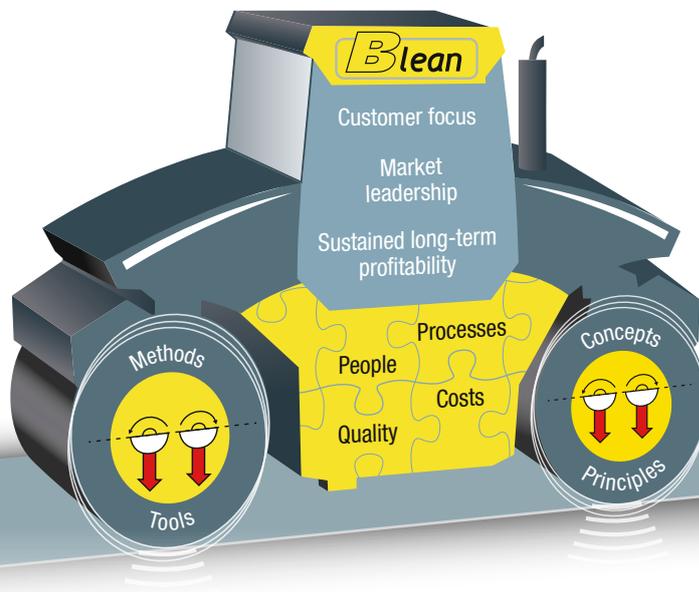
CORRECTIVE ACTION.

Corrective actions are specific measures taken immediately after deviations occur. They are discussed, assessed and documented in meetings and within the teams, and responsibilities are defined. Their implementation is monitored. [VA-Q-020, VA-Q-021]

PREVENTIVE MEASURES AND RISK MANAGEMENT.

The basis of preventive product and process improvement are customer dialogues, product and process audits, and evaluations and analyses of internal and external complaint data. Our goal is to learn from errors by systematically revealing weak spots, evaluating them, taking counter measures and monitoring their efficiency, e.g. in the changing number of complaints. [VA-Q-022, VA-Q-026]

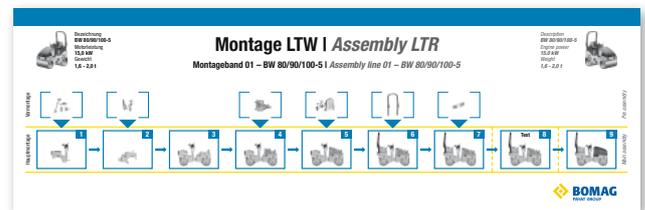




BLEAN.

Blean is the term for BOMAG's own production and added value system based on the principles of lean management. The Toyota production system, which aims to combine the productivity of series production with the quality of workshop production, serves as a guide for this. In this respect, Blean projects are carried out in different business areas (e.g. assembly lines, manufacturing areas, or administration processes) and optimised with the aid of specific methods. The focus is on increased customer orientation in order to safeguard its market leader status and set the company apart from the competition. The company should operate sustainably and profitably by implementing customer-oriented and efficient processes. The emphasis here is on employees and processes as well as on quality and costs. All of the factors are closely linked and form the basis of the company's

success. The different methods (e.g. Muda, value stream, 5S, materials management, equipping, planning and control) and the instruments applied are used to analyse processes and to develop method-specific standards, which are implemented step-by-step in the departments.



CUSTOMER – BOMAG – CUSTOMER: A CONSTANT DIALOGUE.

COMMUNICATION WITH THE CUSTOMER.

Communication with the customer is the responsibility of Sales prior to and during a business transaction. The customer is informed about the advantages of our products by brochures, press reports and adverts in the different media. Additional steps in the form of contacts, quotations, financing issues, etc., are taken in accordance with defined internal customer order processing. New products are developed in cooperation with customers in order to take into account the requirements of the final users right at the outset. Product observations are made in particular by our Product Management, but also by other departments in contact with the customer; these observations are then passed onto the relevant specialist departments and QM. Weak spots are presented in detail and eliminated in cooperation with the specialist departments.

Additional direct communication channels, including personal contacts, are established with our domestic branches, foreign subsidiaries, major dealers and key accounts. This speeds up the flow of information and increases efficiency. [VA-S-001, VA-S-002, VA-S-004, VA-S-010]

PARTS & SERVICE.

“Out of sight, out of mind” does not apply to BOMAG; straight after a purchase, BOMAG After Sales takes over responsibility.

Always with its focus on being the service champion, BOMAG has made it one of its top priorities never to leave customers to fend for themselves should any problems arise.

High quality original parts and excellently trained service staff ensure that BOMAG is able to realise this. Thanks to the state-of-the-art logistics centre, Ehrhardt + BOMAG Logistics GmbH, spare parts orders are always guaranteed to be processed quickly and reliably. This makes for optimum after sales customer service. [VA-AS-001, VA-AS-002, VA-AS-003]



On site service



MARKET LEADERSHIP THROUGH INNOVATION.

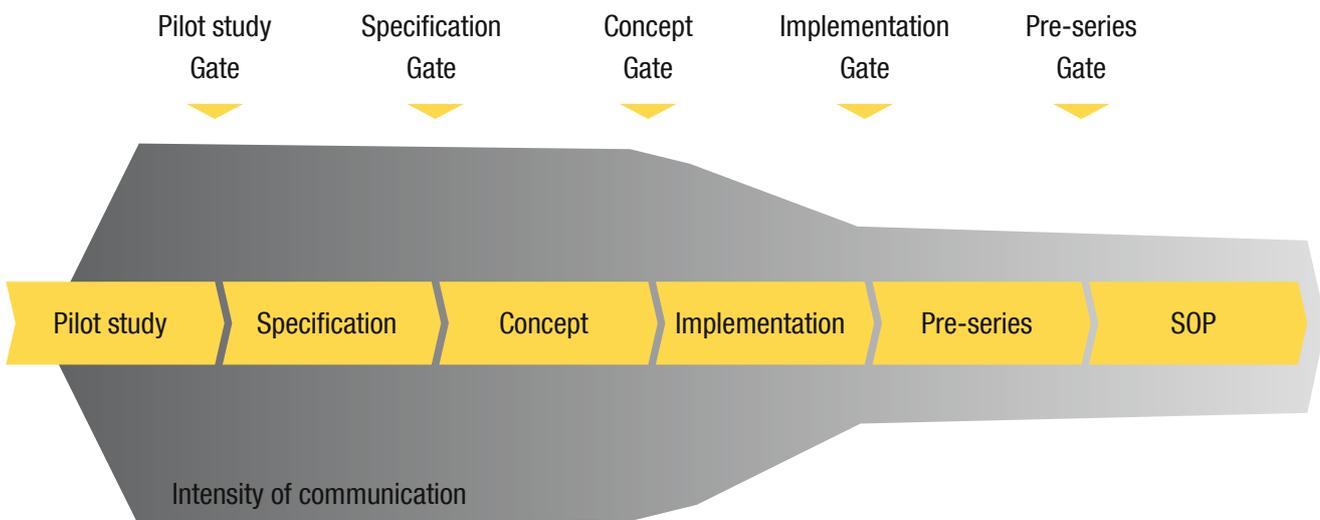
PRODUCT DEVELOPMENT PROCESS.

Product development at BOMAG is a company task which involves close cooperation and interaction of all departments in a process. This product development process (in short: PDP) follows a Stage-Gate model, divided into different phases; each phase is completed with a review, i.e. examination by those actually involved in the project, and the person commissioning the project (Gate). The main feature of the PDP is the involvement of all departments throughout the entire process, in other words, those departments that usually implement or process work packages later on in the process. This means that all requirements and outline conditions can be incorporated into the specification and concept, largely allowing time-consuming, costly loops to be avoided. Furthermore, by taking aspects from all business divisions into account early on, the product can be more specifically tailored to customers and markets.

To increase planning reliability in series development, innovations are made ready for the market in parallel to the development process so that they can be integrated into series projects. This prevents components with a lower degree of readiness from negatively affecting the deadline or quality of the start of series production.

Moreover, the roles and jobs of those involved in the project become clear when the product development process is accurately defined, making the process more transparent as well as easier to plan. In terms of the increasingly global development activities within the BOMAG Group, these are core prerequisites for enabling leverage of synergies.

PDP is controlled by a project manager who is responsible for coordinating and managing the project. From an organisational point of view, this person is not assigned to any of the departments involved in the project, which means the project result and quality can be guaranteed independently of the individual departments. [VA-E-010]



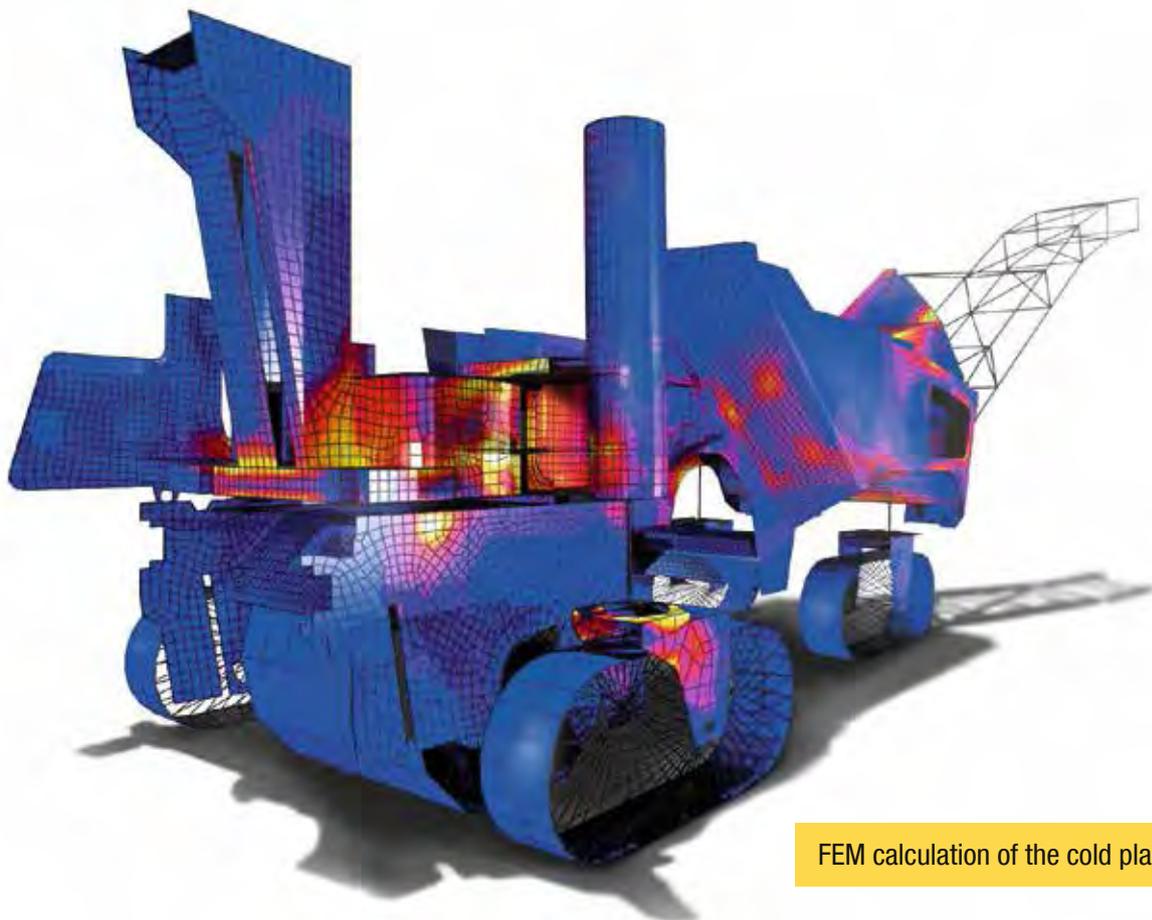
Product development process at BOMAG.



A modular structure and the use of standards simplify the work process, create a clearer overview, and save costs. Standards are set out in the relevant instructions and the BOMAG factory standard. [VA-E-002, VA-E-004]

Validation, i.e. the verification of design stages by means of tests and suitability tests, is performed by our test department and documented in reports.

If modifications to existing machines are required, this procedure is handled by Marketing and Engineering. [VA-E-003]





BOMAG Supplier Day

SUPPLIER AND PROCUREMENT MANAGEMENT

EVERYTHING NEEDS TO BE RIGHT: THE QUALITY, LOGISTICS, PRICE AND TECHNOLOGY.

SUPPLIER MANAGEMENT.

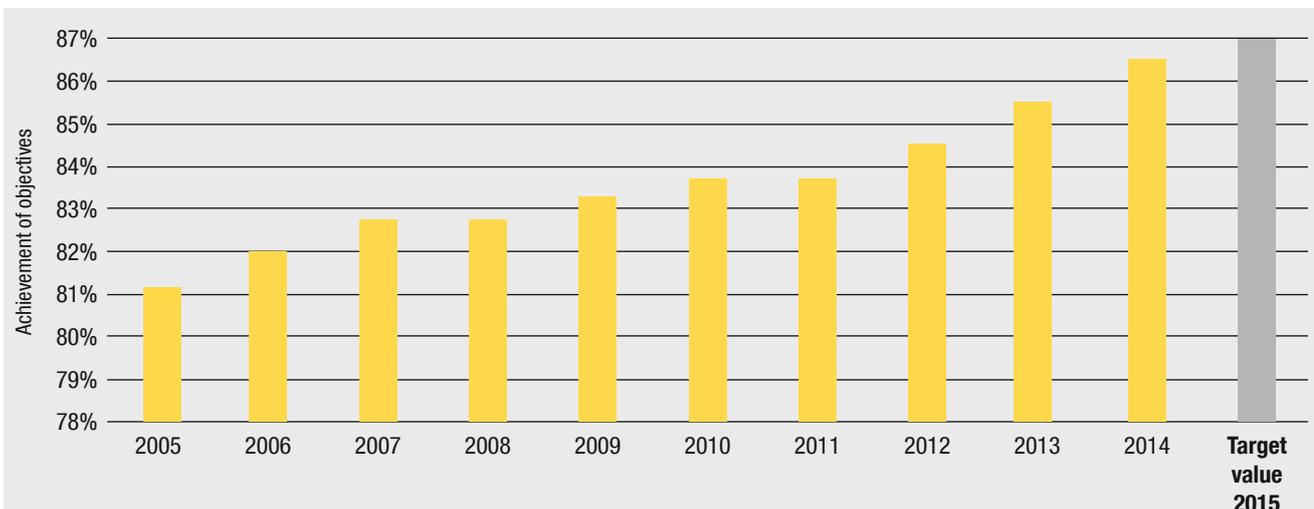
Our machines include a high percentage of purchased parts, which means the quality of our machines is directly influenced by the quality of the supplied parts. The high expectations of our customers and the high standards we demand of ourselves are transferred directly to the supplier.

Defined procedures such as

- supplier selection, qualification and approval
- supplier development and care
- optimisation of supplier numbers
- supplier evaluation

ensure that the procured products meet the specified requirements.

Regular supplier audits and concluded Quality Assurance Agreements are also essential elements of our supplier management. [VA-Q-002a, VA-Q-002b, VA-Q-002c, VA-Q-003]



Supplier evaluation.



SUPPLY CHAIN MANAGEMENT.

The market conditions for BOMAG are subject to global changes: Competition increases – prices fall. This changeable environment necessitates the guarantee of profitability and competitive edge by continuously reducing costs and improving processes. Supply chain management at BOMAG tackles this global challenge along with the allocated departments and Global Sourcing to ensure a strategically oriented, professional supply of the required materials. The following tools are applied in the process [VA-SC-001, VA-SC-002, VA-SC-003, VA-SC-004, VA-SC-007, VA-SC-008, VA-SC-009, VA-SC-011, VA-SC-012]:

- Worldwide supply chain requirements: Standard requirements of suppliers and prerequisite for working with BOMAG
- Commodity structure: Development of global commodity strategies
- Cost breakdown: Creation of transparency in the costing structure
- Sourcing table: Universal sourcing decisions by involving all specialist departments concerned
- KPI reporting: Monitoring relevant key figures
- Total cost of ownership (TCO): Cost considerations from the point of view of TCO

The focus is also on the efficiency of the supply chain and its continuous improvement:

- Warehouse concept: demand-led supply of production with the required materials and rendering upstream services
- Direct Kanban: Direct provision of containers by the service providers and suppliers for exchange at the assembly line
- Blean: internal activities for a lean supply chain which is geared to internal and external customer requirements and which safeguards the competitive edge
- Packaging: Reduction of packaging materials with own reusable packaging

VERIFICATION OF PROCURED PRODUCTS.

Passing initial sample testing is absolutely crucial for releasing procured products for series use. Other supplies are tested for compliance with set criteria; the objective here is to aim for direct delivery to our production facility. [VA-Q-013a, VA-Q-013b, VA-Q-013c, VA-Q-013d]



PRODUCT REALISATION

HIGH-TECH PRODUCTION FOR HIGH-TECH PRODUCTS.

CONTROL OF PRODUCTION.

Our production division essentially encompasses the following manufacturing and assembly areas:

- Mechanical production
- Steel fabrication
- Cabin construction
- Drum manufacture
- Powder coating and paint shop
- Electrical, light, heavy and customised machinery assembly

Our philosophy is to use the most cost-effective production techniques in each case to manufacture our machines so that we are able to ensure production independent of suppliers. This is also to ensure that we stay up to date with developments in machine tool technology. The definitions for production are to guarantee that our products can be manufactured to the defined requirements and to the satisfaction of our customers reliably, on schedule, and cost-effectively.

PLANNING PRODUCT REALISATION.

Machines, materials, methods and workers are precisely matched to the respective production plan and adjustments are made for the constant changes.

A high level of reproducibility and observance of the tightest tolerances are achieved by planning and the use of installations.

Purchasing, Engineering, Production and Quality Assurance work in close cooperation on production planning in the form of simultaneous engineering. Series production will only start after the various running-in procedures, initial samples and other release processes have been successfully completed. [VA-Q-009, VA-Q-012a, VA-Q-012b, VA-P-001 bis VA-P-012]

TRUST IS GREAT, BUT CONTROL IS ...?

MONITORING AND MEASUREMENT.

BOMAG aims to achieve utmost reliability when it comes to internal and external processes. However, to err is human and mistakes will always be made at work. Testing at the appropriate stages of the product realisation process is a way of limiting the residual risk. It should take place where it makes sense in terms of the process flow and being economically viable. Our goal is to minimise the number and extent of tests by continuously optimising the processes. Reliable processes automatically mean high product quality.

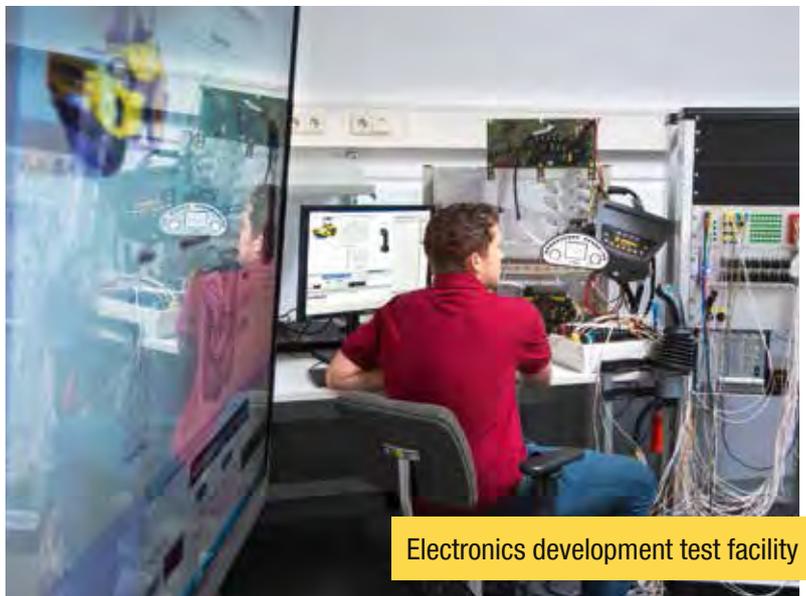
VERIFICATION OF THE PRODUCTION PROCESSES.

Reliability of production processes is planned and ensured by the following measures:

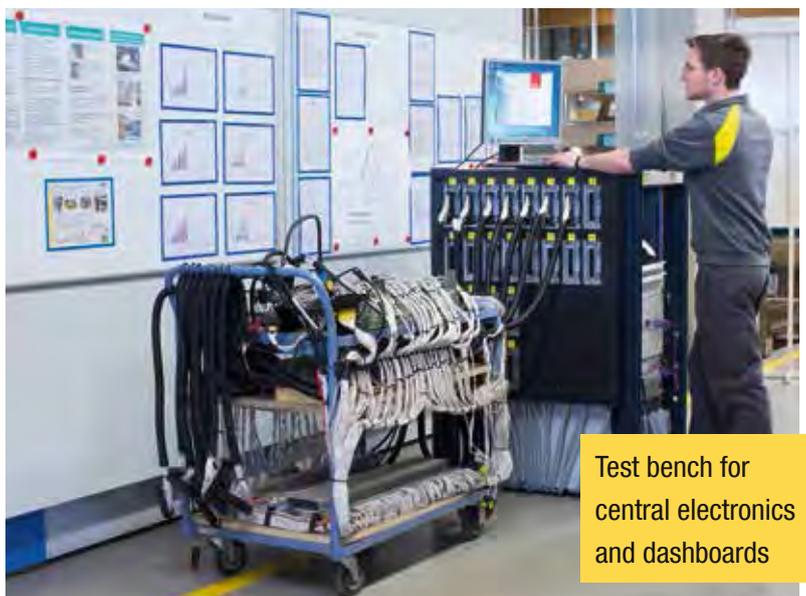
- Regular inspections of machine tools and process capability
- Up-to-date and correct drawings, machine programs, work schedules and assembly catalogues
- Quality capability of test and measuring equipment
- Responsible and trained staff
- Preventive maintenance



Worker self-assessment in mechanical production



Electronics development test facility



Test bench for central electronics and dashboards

EVERYTHING IS FINE.



Oil purity measurement

VERIFICATION OF PRODUCTS.

Product testing begins at the supplier's and ends when the finished machine is handed over to the customer. Additional coordinated inspections are made

- in incoming goods
- in the form of worker self-assessment in production
- in the form of interim inspections in production and assembly
- in the form of a final inspection of the finished machine and directly before shipping.

The complete history of the machine is continuously documented and kept for ten years. [VA-Q-005]



Spectral analysis



Check with coordinate measuring device



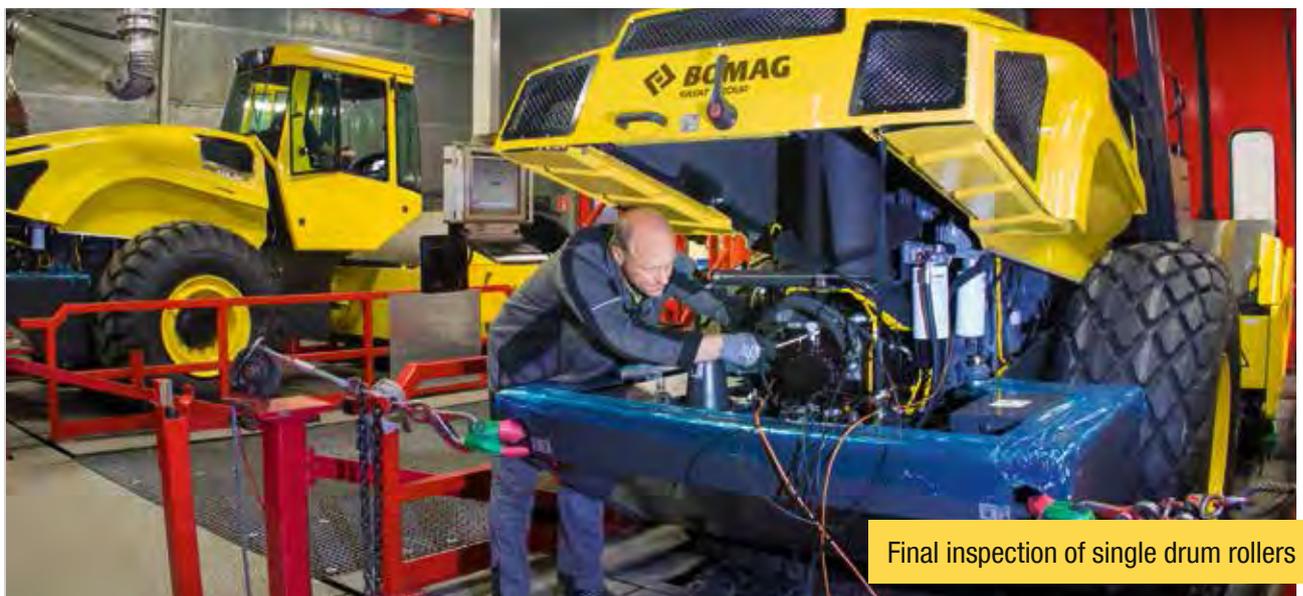
PRODUCT REALISATION

THOROUGH TESTING, INSIDE AND OUT.

FINAL INSPECTIONS.

After a set running-in period, all machines are thoroughly tested in the testing facility. Keeping up to one hundred measured values per machine within very tight tolerances guarantees that the customer gets exactly what was requested in the order.

The target values are specified by Engineering in coordination with Marketing and are called up from an electronic database for each machine type prior to testing. All test stages prior to, during, and after the final inspection, as well as documentation of deviations, are specified in detail in test instructions. [VA-Q-006a, VA-Q-006b, VA-Q-007, VA-Q-018]



COMPLETE TRANSPARENCY.

MARKING AND TRACEABILITY.

Parts are marked to enable their clear assignment to technical documents, such as drawings and parts lists. Identification is also possible by marking the containers in which the parts are transported, e.g. by means of work schedules, storage documents, transport documents and the associated storage locations. Work performed on the part can be assigned to a worker by means of a personal stamp. This guarantees traceability in the case of a subsequent special inspection, selection, or product recall. [VA-Q-015, VA-Q-019]

PRODUCT MAINTENANCE.

As soon as an order is placed, the supplier is notified about packaging, cleanliness, preservation and method of transport. These regulations also apply internally, from the storage of the individual parts procured to interim storage and shipping of the finished machines. This ensures the high BOMAG quality requirement at every step of the production chain. [VA-P-010, VA-Q-018]



QUALITY DOESN'T JUST HAPPEN.

TEST AND MEASURING EQUIPMENT.

Quality Assurance is responsible for managing the test and measuring equipment. It is in charge of procurement, registration, calibration, verification, storage and provision of around 3,500 test and measuring instruments. The task requires a high degree of attentiveness, as the measurement results obtained by the test and measuring equipment are the trusted basis for all other decisions and measurements. Defined permanent and periodical calibration and inspection ensure they can be used reliably. [VA-Q-004]

CONTROL OF FAULTY PRODUCTS.

Products which deviate from specifications are recorded, marked and separated out to exclude them from further use. Every employee is responsible for identifying and reporting faults; Quality Assurance then takes any further action required. [VA-Q-023, VA-Q-020]



3D coordinate measuring machine used for incoming goods inspection

QUALITY DOCUMENTED RELIABLY.

CONTROL OF DOCUMENTS.

The QM system ensures that there are enough up-to-date documents available in terms of tracking and verifying the quality requirements of our products. All of these documents are easy to identify and can be retrieved along with the review status and validity period from our computer system at any time. The periods for retaining data and removing and destroying old documents are specified. [VA-Q-024, VA-Q-001a, VA-Q-001b]

CONTROL OF RECORDS.

Records are made of all specified quality-related activities. These are to be kept to verify fulfilment of the quality requirements and efficacy of the QM system. Archiving and registration are mainly in electronic form and therefore accessible at any time to internal and external users. Depending on requirements, records may relate to a system, process, product, or production equipment. [VA-Q-025]

MAINTENANCE.

Preventive maintenance ensures a continuous production process and the consistently high level of quality of the processes and thus the products. [VA-Q-022]







“There’s never been an ultimate goal. The goal is simply to be that little bit better every day.”



Ludger Schaus
Head of Quality Management

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