BENEFITS OF IMPLEMENTING AUTOMATION INTO A PRODUCTION LINE

KEY ADVANTAGES OF AUTOMATION

Process flows and measuring techniques can be efficiently used through the application of an automated system. Many systems can be adjusted to accommodate customer requirements.

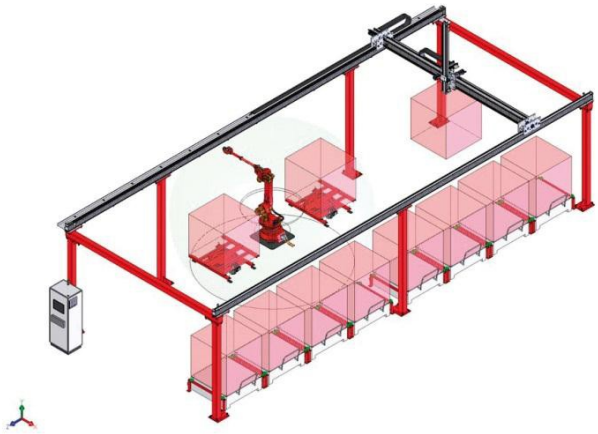
If you are in the process of investigating an optical technology solution or you already have one and would like to integrate automation into this solution, this detailed whitepaper contains all the information necessary to accomplish the task.

CONTENTS:

AUTOMATED SOLUTIONS

In quality assurance job shops, production times can make or break your bottom line. Results must follow quickly and efficiently from start to finish. Breaks in production cost money and can be reduced to a minimum with an automated solution. Automated solutions are especially suited where recurring measuring tasks are involved. This is already standard in many production-related quality control processes.

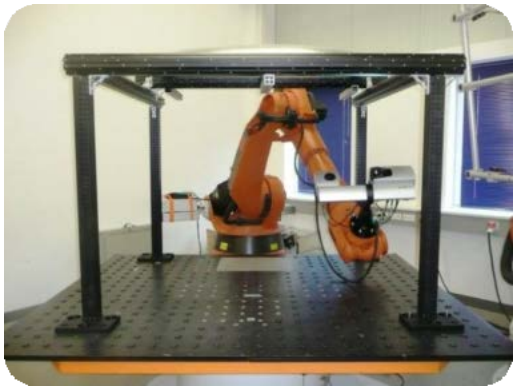
Geometric and surface data respectively are rapidly and extensively recorded. Automated solutions open a totally new perspective in automated metrology, especially in branches such as the automobile industry, aerospace, engineering and foundry.



INDIVIDUAL MASTER PLAN FOR OPTIMAL INTEGRATION

Basically the systems are very similar due to standard components. All relevant components such as sensor system, software, robots (including portal systems), safety fences and safety features and equipment are combined and offer a customer-oriented adaptation of the existing/available components (interface electrically as well as mechanically).

With regards to configuration of the system, standard components can be reverted as well. These are customizable (freely adjustable) in terms of customer requirements and related to the degree of automation, the software interface, the linking up of parts, etc.



AUTOMATED 3D DIGITIZATION

3D digitization opens up a multitude of possibilities. An all-over gathering of the entire component surface brings new dimensions of significance into the processes. You can find further information regarding this subject on the whitepaper for optical metrology.

With sensor control through the robot, a fully automated component detection can be achieved, thus this can be adapted to different component sizes.
Whether the customer wants to measure series-accompanying, wants to do a first sample, or wants to test the quality of a cast iron part, many fields of application are possible. A one hundred percent inspection of components, e.g. in the inline metrology, the cycle time and the evaluation (what is to be tested) must be synchronized with to one another.

It is important that the environmental conditions in automated metrology are constant. Variable environmental conditions, such as change of light, vibration or temperature fluctuation have a negative effect on the data acquisition. Special emphasis must be placed in the design of the automated cell to ensure that work can be guaranteed even in the most difficult of environmental conditions.

AUTOMATED SURFACE INSPECTION

The surface quality of a product is what the customer primarily sees, therefore the continuous detection of surface irregularities at an early stage has become an essentially important feature in quality control.

As the surface quality is inspected prior to the handling of the components, the application of a surface inspection system significantly minimizes wastage. Thanks to a short measuring time, a 100% inspection is always possible. In this case a 100% inspection is also dependent on the cycle time, size of the components and the expected result.

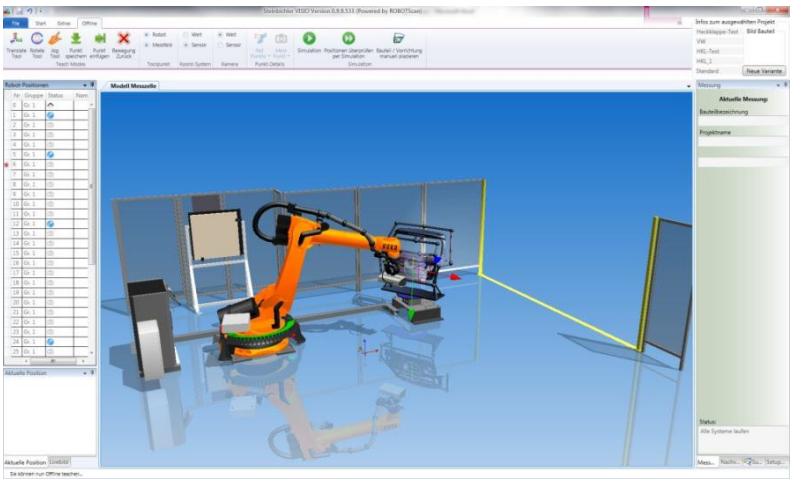
Due to the permanently increasing competition and cost pressure an early and objective detection of surface imperfections during the production process is indispensable. The corresponding tool and production processes can be immediately optimized with the result, which in turn increases the efficiency of the quality control. This also has a positive reaction on the improvement of the surface as well as the economic application of working hours and raw materials.

For further information regarding this please refer to the whitepaper for surface inspection systems.

AUTOMATION SOFTWARE

The entire process beginning with the programming stage right through to shut down of a program can be covered with one automation software. From project start through to the simulation including collision control and evaluation right through to logging, the processes are in a self-contained integrated and continuous workflow.

Offline programming can take place on a separate programming station. Thanks to a central databank, information containing specific software solutions can be immediately provided to the real automated systems. This saves idle time and reduces errors during the transfer of data using a data carrier. An integrated user management offers the possibility of chosing between the user and programmer. The user can activate the dimensions of the components and the programmer has the right to launch robot programs (offline/online).



Certain automation software solutions have a completely modular outlay, providing open interfaces in every direction. Various robot types, sensors as well as evaluation software packages can be connected with each other, hence offering flexibility and independence. An integrated collision control during offline programming increases the operational safety and reduces the overall system occupancy time.

During offline programming it is possible to simulate the measured data. This has an enormous time advantage in the offline programming because the quality of the simulated scans can immediately be visually assessed.

With certain selected solutions through active data management and a history management, measurements for each component can be individually recalculated with revised evaluation parameters. Furthermore an archiving feature offers the possibility of deleting measurements for each project individually or to archive them.

WHAT DOES A CONCRETE PRACTICAL EXAMPLE FROM STEINBICHLER OPTOTECHNIK GMBH LOOK LIKE?

Application: Automated 3D digitization
Branch: Automobile industry

"It is better with a lot of pixels" – a photo-optical three-dimensional measurement method in the pressing plant at BMW, Regensburg is examining car body parts over the entire surface, thus making quality control more efficient.

Definition of a project / Job definition:

A metrology system for measurement and test engineering is being used in the quality assurance process of BMW AG, Regensburg, Press plant (TR-30), whereby a sensor scans a component surface to determine measurement points at individual points.

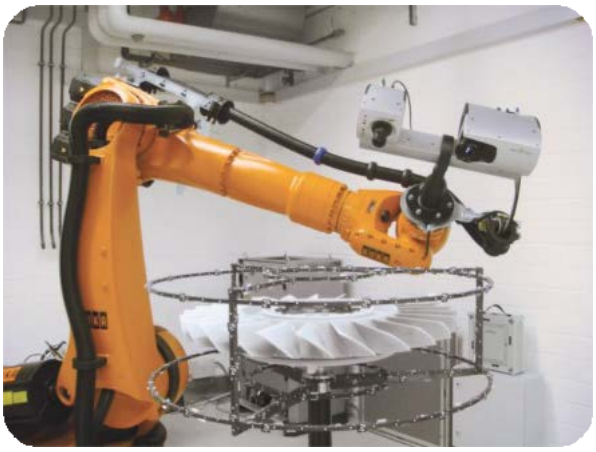
Solution:

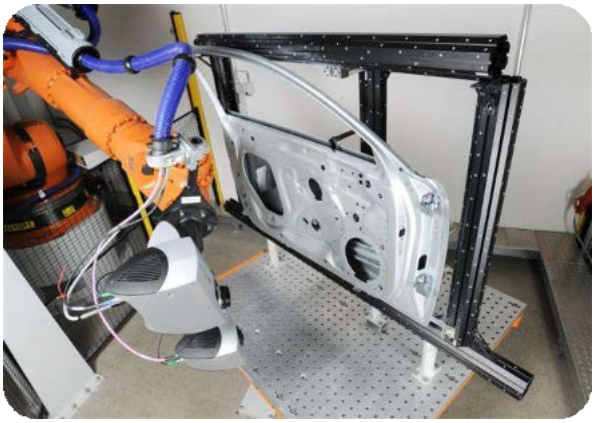
Since July 2010 an additional innovative measuring method using structured light projection is being used. This method of actual dimensional evaluation partially replaces the tactile metrology. Dimensional accuracy means that the actual dimensions of a component are within the allowable deviation of the agreed size

Benefits for the customer:

The advantage of the new measurement technology is that it is now possible as per example "page frame" to calculate if necessary with over a million Fotopixel-measuring points as opposed to the previous 500 in the old metrology system. This enables us to detect a variation tolerance in the complete component surface, explains Roland Vanino (TR-30), Quality manager measurement technology for advantages in optical metrology.

The complete measuring system is installed on a robot, and is guided over the component with an industrial computer. The sheet metal parts are clamped on a grid plate either horizontally or vertically. Whilst the component is being tested on the one side, a new component can be fixed on to the opposite side in future. This reduces the cycle time significantly.





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