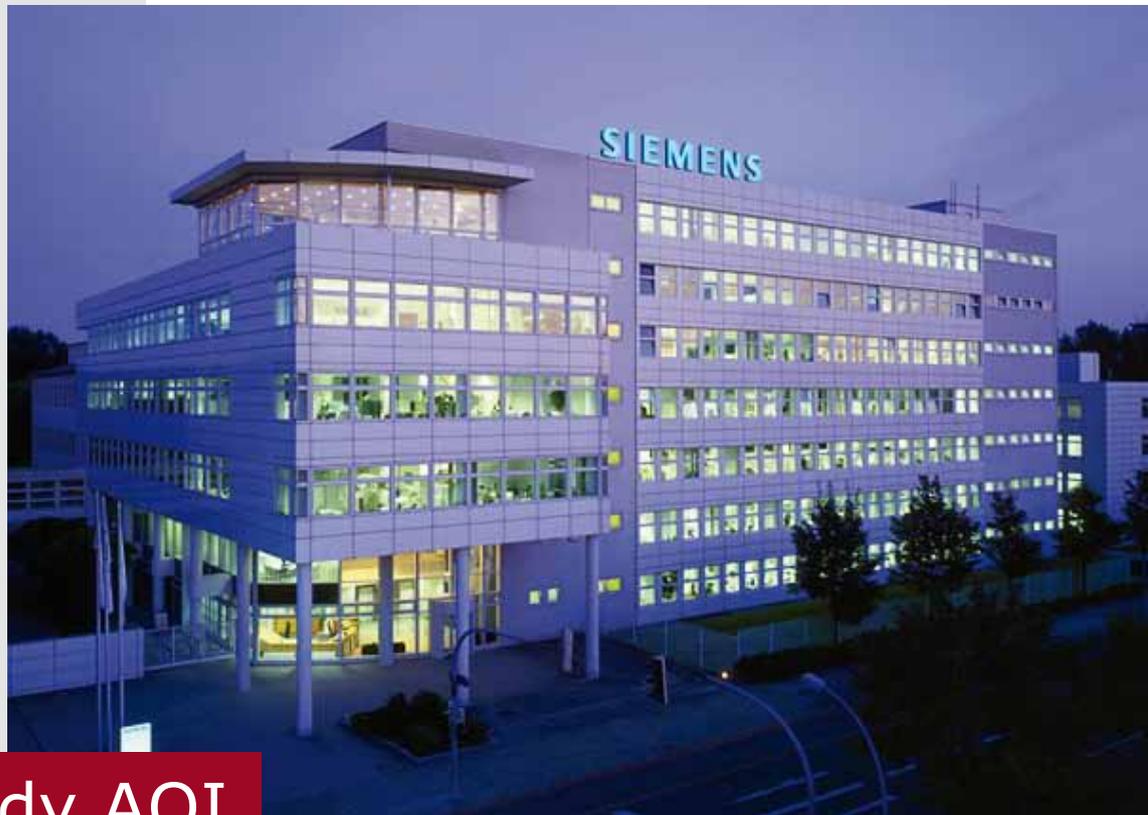


SIEMENS

A perfect team:
flexible, reliable AOI and
PPVS test coordinator



Case Study AOI

A perfect team: flexible, reliable AOI and PPVS test coordinator

The Rail Automation area of the Siemens Mobility Division in Braunschweig, Germany develops and manufactures hard- and software for rail traffic worldwide. Because the products are strongly specialized, electronic components are often needed only in very small piece counts, for which the absolute highest safety standards nonetheless apply. Thus, Siemens was confronted by the task of finding an inspection solution that can be implemented economically, despite smaller lot sizes and a wide variety of types.

With the AOI system S3088 from Viscom and the PPVS test coordinator specially developed by Siemens to assume coordination of inspection development, this goal has been realized.

Siemens Mobility Division Rail Automation: hard- and software for control and safety systems in rail traffic

Speed, reliability, comfort and ultimately price are decisive factors determining the attractiveness of track-bound mobility – today more than ever. Rail automation plays a crucial role in the development of new solutions. The Braunschweig location of the Siemens Mobility Division, with nearly 3000 employees, is one of the largest rail automation manufacturers in the world. In particular, electronic signal boxes, on-board computers, rail traffic-specific sensors and communication technology are developed and manufactured here. Braunschweig serves as lead factory. In other words, all other factories are controlled and all replacement parts for Siemens rail technology are distributed from this location.

Electronics production at Siemens in Braunschweig is influenced by rail technology's particular requirements. One aspect of these requirements is that systems delivered by Siemens, such as electronic signal boxes, must be provided with replacement and extension parts over periods of a typical 25 to 50 years. Further, this means very small lot sizes must be manufactured economically within short delivery times, while maintaining the highest quality standards. Strict development and production guidelines generally only permit the use of particularly qualified and approved component types from select manufacturers. In practice, this can mean that one component on one assembly has not yet been approved, while another has already been discontinued by the manufacturer.

In addition, all products must be developed and produced to meet railway application standards. To accomplish this, Braunschweig has an accredited testing center where products are subject to a full range of tests such as vibration and shock, climate chamber or EMC investigations.

AOI S3088-II takes on quality control of electronic components

In electronics production at Siemens Braunschweig, rigid printed circuit boards in standard and custom formats predominate. Due to branch-typical post-delivery warranties, both antiquated and ultra-modern rail technologies come into play. Mixed SMD/THT assembly is also often used.

In the past, the small lot sizes and high type variety have made the use of AOI for placement and solder joint inspection appear problematic. For this reason, quality control was conducted by the human eye, supported by magnification. But because developments in AOI technology have made great strides during recent years, its use can be profitable even in this production spectrum; therefore, the decision makers at Siemens set out to find an appropriate AOI solution.



Viscom OCR Recognition

The production factors listed above made simple inspection program creation that would accommodate low volume/high mix production especially important. "But angled view cameras for positive inspection of PLCC and fine pitch solder joints, for example, as well as high performance OCR recognition, also stood right at the top of our requirements list", states Reinhard

Niewerth, who monitored the benchmark as it was conducted. Siemens places a great deal of importance on OCR, because all stamped and therefore identifiable components are checked against the requirement and approval status in their component data bank. Viscom further optimized their own OCR software to meet these demands. Now the stampings of a greater number of alternative component types can be checked automatically and reliably by AOI, with a high degree of flexibility. The repair station software Haran was also further optimized for these boundary conditions; for text recognition false calls that cannot be completely excluded, Haran displays all permissible stampings for the particular component to the repair person at a single glance. This was a decisive plus point during selection of the AOI system.



Viscom AOI system in production.
 Fl.t.r.: S. Hannemann (Siemens AG), W. Herbig (Viscom Repräsentant Herbig Technologies), T. Krause (Siemens AG), J. Sander (Werkstudent Siemens AG)

In addition to all the technical requirements, a good price/performance ratio and a well-known supplier who could deliver high performance, proven technology and good service were also desirable. After comprehensive evaluation, the Viscom S3088-II inspection system emerged as winner in the benchmark. With this AOI, now the very time-consuming visual quality control could be replaced by a fully automatic inspection.

In order to also achieve optimal coordination between various test realms and inspection program developers, the Siemens PPVS Test Coordinator was developed within the context of a student practical project.

Together with the PPVS Test Coordinator, the S3088 provides reliable test coverage – convenient and time-saving

Today, integrated inspection concepts combining optical and electrical test are standard in most electronics production. Less standardized and until now, not auto-

mated at all, is the harmonization between the different inspection program developers involved. This is where the PPVS Test Coordinator from Siemens, in cooperation with the AOI system and the electrical test processes, assures reliable test coverage. The abbreviation PPVS stands for the basic defect models to which all defects occurring in electronics production can be assigned, according to four criteria: component Presence, correct Polarity, correct Value and Solder quality.

Matrix of Siemens PPVS Test Coordinator

“Our goal was to link all the test realms together seamlessly to make sure all four criteria are actually tested for each component”, explains Jens Sander, who developed the PPVS Test Coordinator, and adds: “This gives the different test developers a convenient communications platform for coordinating the individual tests with each other. As one example, when a test developer’s “own” inspection process can detect certain defects only with great effort or not at all, he records this fact as a commentary to the affected component and so assigns coverage of this defect to the developer of other test processes. The program automatically checks which test coverage we have. This allows us to quickly see where we need additional work or where there might be unnecessary redundancies. Currently we must realize inspections for an assembly with 1130 components in 3 test realms; coordinating this in any other way is simply impossible.”

The PPVS Test Coordinator documents which defect on which component of a printed circuit board is revealed according to the PPVS principle, separately for the individual inspection processes. This documentation can be done manually for individual components or for groups of the same type of component. However, it can also be automated, by importing and interpreting the test coverage reports of each test process. In the process, the Viscom inspection depth report makes loading the S3088 AOI defect coverage to the PPVS Test Coordinator virtually as easy as pressing a button.

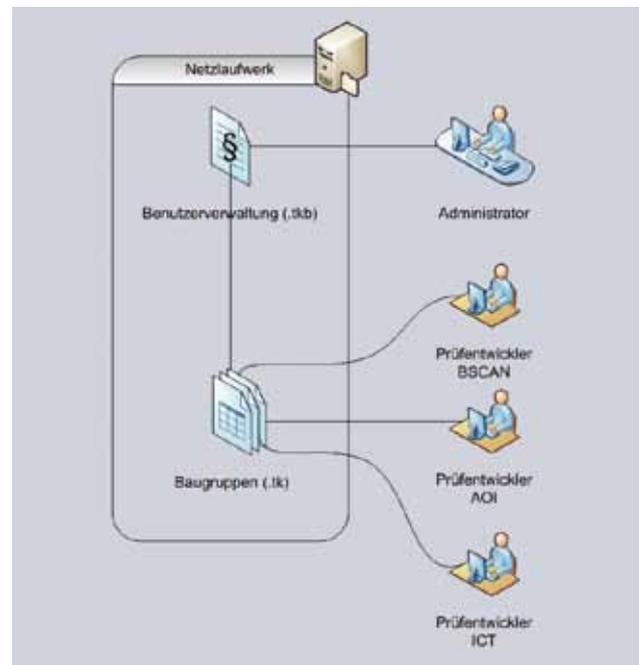
“The operator management almost completely bars missing entries and thanks to the history function, who made which entry can be ascertained at any time. Also, reports can be generated automatically and tasks assigned. These are additional strengths of the tool”, affirms Jens Sander. This software is used both to accompany development as well as to document final results.

Detlef Baer, Senior Manager of Product Development at Viscom, can only agree with this: “Linking the Viscom inspection depth report to the PPVS Test Coordinator can present a very helpful instrument for many of our customers, because the downsides of “communication on call” are resolved and the reliability of inspection development is significantly and noticeably increased.”

Double control – optimal quality

As a result, the AOI system S3088-II brings Siemens a very reliable, effective quality control for electronics assembly production. The angled view cameras guarantee a positive defect detection, even for critical components in the fine pitch range for which a purely orthogonal inspection would not be dependable enough. And with the high performance OCR function, Viscom is able to verify the stamped components quickly and reliably. Last but not least, simple operation with EasyPro ensures that the low volume/high mix production typical at Siemens can be accomplished economically and with 100% quality.

The AOI is optimally enhanced by the PPVSTest Coordinator. This software tool presents a convenient communications platform to coordinate the various testing realms. This greatly eases day-to-day operations and at the same time, makes a significant contribution to securing optimal defect coverage. AOI S3088-II and Siemens PPVS Test Coordinator: the perfect team for reliable and easy to manage electronics production



Optimal Test Coordination

Are you interested in more details on this application or do you have any question regarding combined inspection? The Viscom SP Division will be glad to help you.

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