

MM 4692A-11

An Industry Survey of Automatic Defect Classification Technologies, Methods, and Performance

Kenneth W. Tobin, Fred Lakhani, Thomas P. Karnowski (KWT, TPK, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6010) (FL, International SEMATECH, Austin, TX 78741-6499)

To be productive and profitable in a modern semiconductor fabrication environment, large amounts of manufacturing data must be collected, analyzed, and maintained. This data is increasingly being used to design new processes, control and maintain tools, and to provide the information needed for rapid yield learning and prediction. Towards this end, a significant level of investment has been made over the past decade to bring to maturity viable technologies for Automatic Defect Classification (ADC) as a means of automating the recognition and analysis of defect imagery captured during in-line inspection and off-line review. ADC has been developed to provide automation of the tedious manual inspection processes associated with defect detection and review. Although significant advances have been achieved in the capabilities of ADC systems today, concerns continue to persist regarding effective integration, maintenance, and usability of commercial ADC technologies. During the Summer of 2001, the Oak Ridge National Laboratory and International SEMATECH performed an industry survey of eight major semiconductor device manufacturers to address the issues of ADC integration, usability, and maintenance for the various in-line and review applications available today. The purpose of the survey was to determine and prioritize those issues that inhibit the effective adoption, integration, and use of ADC technology in today's fabrication environment. In this paper, we will review the various ADC technologies available to the semiconductor industry today and discuss the results of the survey.