Digital Defect Detection System.

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MeadWestvaco wished to replace an aging system that monitored the size, shape and growth of defects in the paper mill's forming fabric decided that the solution should be a learning experience to engineering students. During the paper making process pulp is discharged onto an apparatus much like a conveyor belt allowing the water to drain off leaving a thin layer of paper pulp. The belt, called forming fabric, occasionally gets punctured or torn causing a reoccurring defect in the finished product. In the paper industry shutting a machine down to evaluate a defect can be very costly. Therefore a high speed camera system is used to evaluate the small holes and tears in order to determine if the machine needs to be shut down or not. During the initial meeting with MeadWestvaco the group received a Canon G2 camera and a laptop computer that are to be used in the creation of a new defect detection system. The team toured the facility, finalized the requirements of the new system, accepted the challenge, and took the equipment and knowledge back to VMI to begin work.

The group succeeded in constructing a scale model of the paper mill's forming fabric and reaching a belt speed that approaches the mill's maximum operating capacity. The group then created a process to isolate individual frames form a movie taken with a digital camera. And, a water resistant box designed to protect the camera from the wet environment of the paper mill. Images taken from test runs indicate that the defect detection system is capable of capturing a defect traveling at high speeds. Finally, the group succeeded in creating an easy to follow and thorough manual for the proper operation of the digital defect detection system. The system was delivered in the final meeting with the MeadWestvaco, which included the laptop computer, camera, waterproof box, and various attachments used to mount the box during operation. The paper quality control division of MeadWestvaco said they were pleased with the finished project.

Test Apparatus

Captured Defect