E1-01 The effects of scattered radiation on radiographic quality and methods of elimination of such radiation

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Many mechanical parts are subjected to stresses and strains that may eventually lead to their failure. In order to prevent the costly delays associated with equipment down-time, many parts have to be tested for weaknesses and defects when machinery is constructed or dismantled for maintenance. These procedures are known as Non-Destructive Testing (NDT) methods.

Five types of NDT Methods which are routinely used are: Radiographic testing, Ultrasonic testing, Magnetic particle inspection, Liquid penetrant testing and Eddy current testing. Of these, Industrial radiography plays an important role in NDT in revealing interior defects in materials.

In radiography, almost two-thirds of the radiation reaching the film is scattered radiation which does not form the image of defects. Scattered radiation generated inside and outside a material had a very large effect on sensitivity of detection of flaws since it reduces image contrast.

The effect of scattered radiation on Radiographic sensitivity and the possibilities of measuring scattered radiation has been studied. A number of methods to reduce the effect of such radiation have been considered and tested.

Reduction in scattered radiation intensity was measured under different conditions such as with and without lead intensifying screens, filters, maskings and increasing the source to specimen distance.

Scattered radiation generated inside and outside a specimen has a very large effect on flaw sensitivity, as it reduces the image contrast.

Reduction of the effects of scattered radiation by a number of methods was considered. The most effective method is the use of filters between the specimen and film. Other possible methods of scatter reduction are reduction of the radiation field size by masking and increase of the film to specimen distance up to 10mm.