Scatter and glare are two undesirable effects in x-ray imaging. Improvements in image intensifier systems has reduced glare to a negligible part, while scatter remains the major problem. One way of handling scatter is by measuring scatter signal and correct for it digitally. This method is based on blocking the primary beam by placing a small lead disc in the beam and measure the signal in the shadow of the disc representing the scatter and glare only. However, the introduction of disc perturbs the scattering conditions by preventing scattering sites within its shadow from contributing to the measured scatter. Many attempts to solve this problem appeared in the literature but with limited success.

In this work a theoretical model representing scatter measured using lead discs is presented This model is based on ray tracing and integrating over the scatter source volume with the modifying presence of a lead disc. Experimental data was acquired using a Toshiba mobile surgical x-ray apparatus (model SXT-6-11), and a Data Translation image frame grabber (DT 2861) using lead discs with diameters ranging from 0.2 - 10 cm. The integrating model was setup numerically using Mathematica software. The theoretical calculations based on this model were found to be between 1 to 3 % of the experimental data for field sizes ranging from 2.5 - 12 cm. It is therefore anticipated that this model can be used to predict the amount of scattered radiation in different conditions in fluoroscopic and radiographic systems.