"A Function Relating Portal Film Dose Distribution to Compensator Thickness Map for parallel opposed fields."

Render-Plan 3D version 2.72b includes a utility for designing physical compensators from information on port films (Program imgcomp). This requires a function to convert dose received by the film to compensator material thickness throughout the field. Literature suggests this function is determined by equating film dose ratio (film dose at a reference point in the field divided by film dose at a point to be compensated) to compensator material transmission. Data presented will show this assumption is incorrect for the circumstances examined. Generally, lead or copper screen cassettes are employed with verification film to obtain the image. The cassette, as designed, eliminates almost-all patient scatter radiation from reaching the film. One desires to make the dose to the patient at some 'compensation' plane uniform within certain limits. A simple method for deriving the function relating port film dose distribution and the compensator thickness map needed to produce a uniform dose in the patient compensation plane will be presented. The derived function will be presented for lipowitz metal and lead for 6 MV x-rays. Limitations in the use of this function will be discussed. Measured dose distributions in water, solid water, and polystyrene phantoms for compensators produced using these functions will be presented. Comparison to dose distributions calculated by the Render-Plan 3-D planning system which include the compensator effects will be made.