

Dynamic Wedge (DW) is a special form of intensity modulation where simultaneous collimator motion and dose modulation produces a wedge-shaped isodose distribution. Currently, using film or a detector array, only daily off-line quality assurance measurements of dose profiles are made. A novel method is described that allows the reproducibility of DW fields to be measured indirectly, and independently on-line.

A strip shaped ionization chamber (0.3x16.0 cm with 0.2 cm electrode spacing), has been built to be inserted in the vacant physical wedge slot of a Varian 2100C/D linear accelerator. The long axis of the chamber is parallel to the direction of variable collimator motion. Instantaneous ion current is sampled at a rate of approximately 4 Hz, thus tracking the change in dose rate during a DW treatment. The magnitude of the ion current at any time depends on the area of chamber exposed, dose rate, and collimator scatter.

In this presentation, the basic features and performance tests of the strip chamber are described. The utility of the device to both detect gross errors in DW fields and measure reproducibility of DW fields to within 7% will be illustrated. These results are supported with detector array measurements. With the assumption of known collimator position, strip chamber measurements of monitor units delivered vs collimator position will be shown to be in good agreement with tabulated data. Therefore, verification of the beam intensity profile is also possible with the strip chamber.