

**Purpose:** To investigate possible applications of a Cobalt-60 (Co 60) cone-beam megavoltage computed tomography (CoCBCT) imaging system, developed for patient positioning on Co-60 teletherapy machines, in non-clinical fields such as archaeology and non-destructive testing.

**Methods:** CoCBCT scans were performed on a series of dense objects requiring non-destructive testing using a bench-top imaging system consisting of a Theratron 780C Co 60 unit (Best Theratronics, Kanata, ON) and a Varian aS500 amorphous silicon portal imager (Varian, Palo Alto, CA). Images were obtained on a series of heavily concreted artifacts recovered from a 17th century shipwreck at L'Anse aux Bouleaux in Québec. and on cylindrical test cylinders of hematite-rich shielding concrete obtained during the construction of new linac bunkers in our cancer centre expansion. The CoCBCT images were generated using the FDK back-projection algorithm from transmission portal images that were obtained by rotating the objects by 1.5° degree increments through a full rotation.

**Results:** In the case of the shipwreck artifacts, CoCBCT allowed dense metal features such as lead shot to be identified within the concretion layers, and offered a clear view of the shape of voids and other features that would be difficult or impossible to see without damaging the objects. These images will guide subsequent manipulation of the objects during archaeological assessment. CoCBCT images of the concrete cylinders reveal details in the concrete structure, such as voids or aggregate segregation, that would affect the shielding performance of the concrete. Consistent, uniform distribution of the aggregate in most of the samples implied that the mix was stable and not likely to segregate in the shielding walls.

**Conclusions:** Co 60 CBCT is also suitable for non-destructive imaging of highly attenuating non-clinical objects, including items with large metal features which would limit accurate imaging using kV CT or broad energy spectrum MV CT.

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