

## DEVELOPMENT OF THE MECHANICAL SYSTEM ON A THIRD-GENERATION INDUSTRIAL COMPUTED TOMOGRAPHY SCANNER IN BRAZIL

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The development of measurement geometry for medical X-ray computed tomography (CT) scanners carried out from the first to the fourth-generation. This concept has also been applied for imaging of industrial processes such as pipe flows or for improving design, operation, optimization and troubleshooting. Nowadays, gamma CT permits to visualize failure equipment points in three-dimensional analysis and in sections of chemical and petrochemical industries. The aim of this work is the development of the mechanical system on a third-generation industrial CT scanner to analyze laboratory gas absorption column which perform highly efficient separation, turning the  $^{60}\text{Co}$ ,  $^{137}\text{Cs}$  or  $^{192}\text{Ir}$  sealed gamma-ray source and the NaI(Tl) multidetector array. It has also a translation movement along the column axis to obtain as many slices of the process flow as needed. The mechanical assembly for this third-generation industrial CT scanner is comprised by strength and rigidity structural frame in stainless and carbon steels, rotating table, source shield and collimator with pneumatic exposure system, spur gear system, translator, rotary stage, drives, and stepper motors. The use of suitable spur gears has given a good repeatability and high accuracy in the degree of veracity. The data acquisition boards, mechanical control interfaces, software for movement control and image reconstruction were specially development. This third-generation industrial CT scanner has obtained good spatial resolution and images. The filtered back projection (FBP) tomographic reconstruction algorithm used has shown a faster convergence. The mechanical system presented a good performance in terms of strength, rigidity, accuracy and repeatability with great potential to be used for education or program dedicated to training chemical and petrochemical industry professionals and for industrial process optimization in Brazil.