Particuology Paper

Structure Vision's NuPlant software formed the basis of an academic paper recently published in the prestigious Particuology journal. It describes how Structure Vision's unique approach to solving complex packing problems can be applied to problems of multiple scales, from nanoparticles to packaging radioactive waste.

The full citation is as follows:

**Use of multiscale particle simulations in the design of nuclear plant decommissioning**

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**Abstract:** The application of a digital modelling method that can faithfully take account of three-dimensional shape and inherent physical and chemical properties of each particulate component provides an essential tool in decommissioning design. This is useful in handling of high, medium and low level radioactive waste. The processes involve making decisions on where to cut existing plant components and then how to pack these components into boxes, which are then cemented and kept for long term storage as the level of radioactive declines with time. We illustrate the utility of the method and its ability to take data at plant scale (m-scale) and then deduce behaviours at sub millimetre scale in the packed containers. A variety of modelling approaches are used as a part of this approach including cutting algorithms, geometric and dynamic (distinct element) force models, and lattice Boltzmann methods. These methods are applicable to other complex particulate systems including simulation of waste, building recycling, heap leaching and related minerals processes. The paper introduces the basic concepts of this multi-scale and multi-model approach.

**Keywords:** Cementation; Digital packing; DigiPac; Discrete element modelling; Nuclear waste; NuPlant; Particle shape

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Figure 1. NuPlant simulation of LLW container packing.

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