

Effect of Shape of Cylinder Container on Brazil Nut Effect

김병서, 심재우<sup>†</sup>

단국대학교

(wjshim@dankook.ac.kr<sup>†</sup>)

Brazil Nut Effect (BNE) is one of the Granular Convection phenomena that cause separation of solid substances due to different size (shape, density, etc). This phenomenon is known to involve mechanisms due to the influence of various variables, such as friction, direction of motion between particles. In this study, numerical studies were conducted using the Discrete Element Method to quantitatively assess the effect of the BNE on beads of different sizes in cylindrical container. A total of 128 cases of simulations were conducted, in which each simulation is of 20-second movements under various vibrational conditions. All cylindrical containers have a constant volume of  $9.62 \times 10^4 \text{mm}^3$ . Each container consist of 2mm diameter of 8,999 spherical beads and a 6mm spherical bead. The container movements consisted of vertical frequencies of 10 to 40Hz and amplitudes of 1 to 4.5mm. In addition, the diameter of the upper and lower sides of the cylinder was adjusted to check the effect of the container's angle. The results showed that under the same vibration conditions, the Brazil nut effect occurred faster when the top side of the cylinder had a smaller diameter than the bottom side.