Morrell approach for calculating the theoretical power required

For the calculation of potential energy we need to calculate the Raised Ball Height, H (= h1 + h2).

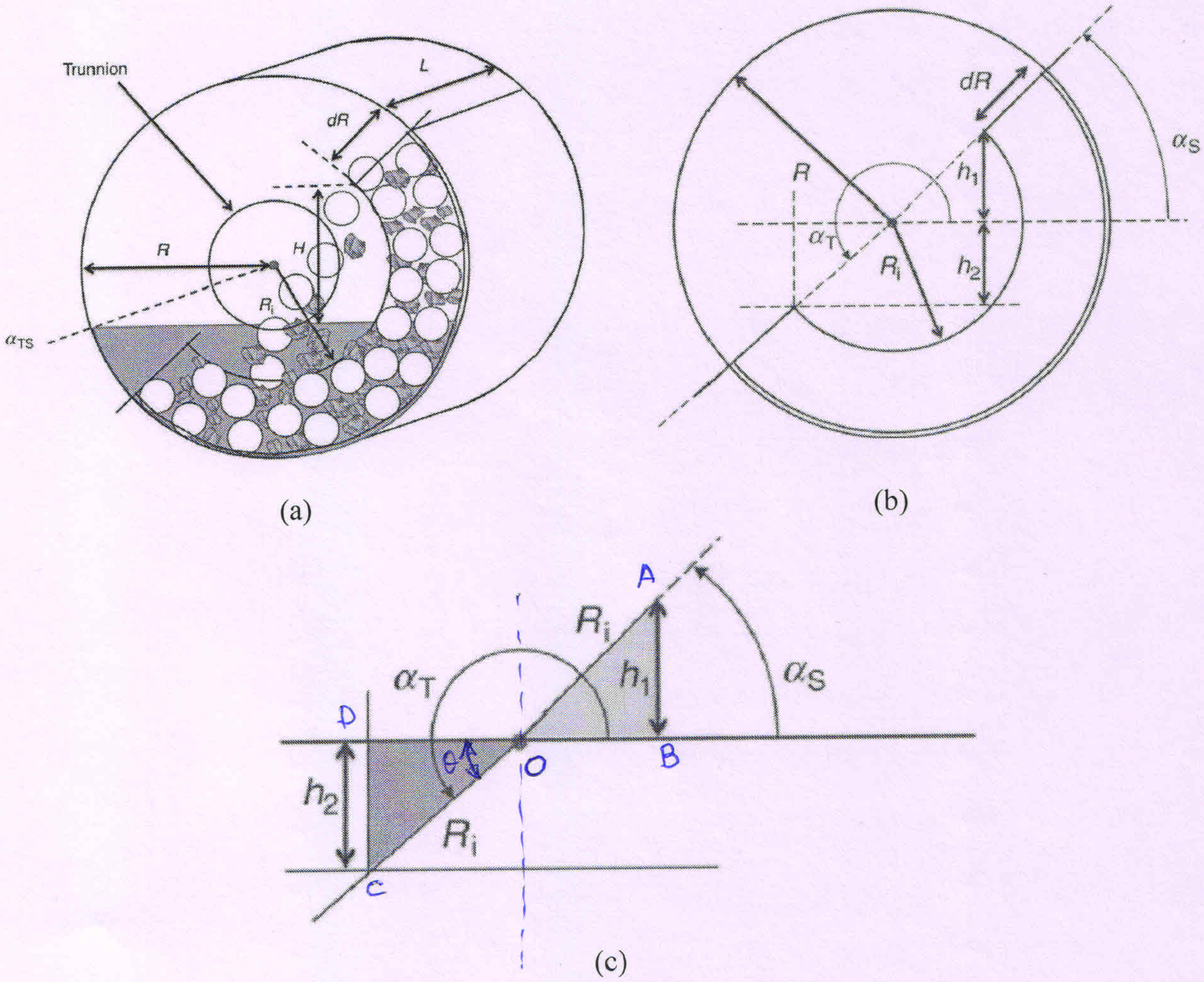

Figure 1. Position of Balls, Solids and Slurry in a Ball Mill.

from ΔAOB $h_1 = R_i \sin\alpha_S$

From the figure (c) $\angle BOC = (360^\circ - \alpha_T)$

and $\angle BOC + \angle COD = 180$

$\therefore$ $(360 - \alpha_T) + \theta = 180$ $\Rightarrow \theta = (\alpha_T - 180^\circ)$

Now from ΔOCD $h_2 = R_i \sin\theta = R_i \sin(\alpha_T - 180^\circ)$

$= -R_i \sin\alpha_T$

$\therefore$ $H = h_1 + h_2 = R_i \sin\alpha_S - R_i \sin\alpha_T = R_i(\sin\alpha_S - \sin\alpha_T)$

Morrell approach for calculating the theoretical power required

For the calculation of potential energy we need to calculate the Raised Ball Height, H (= h1 + h2).

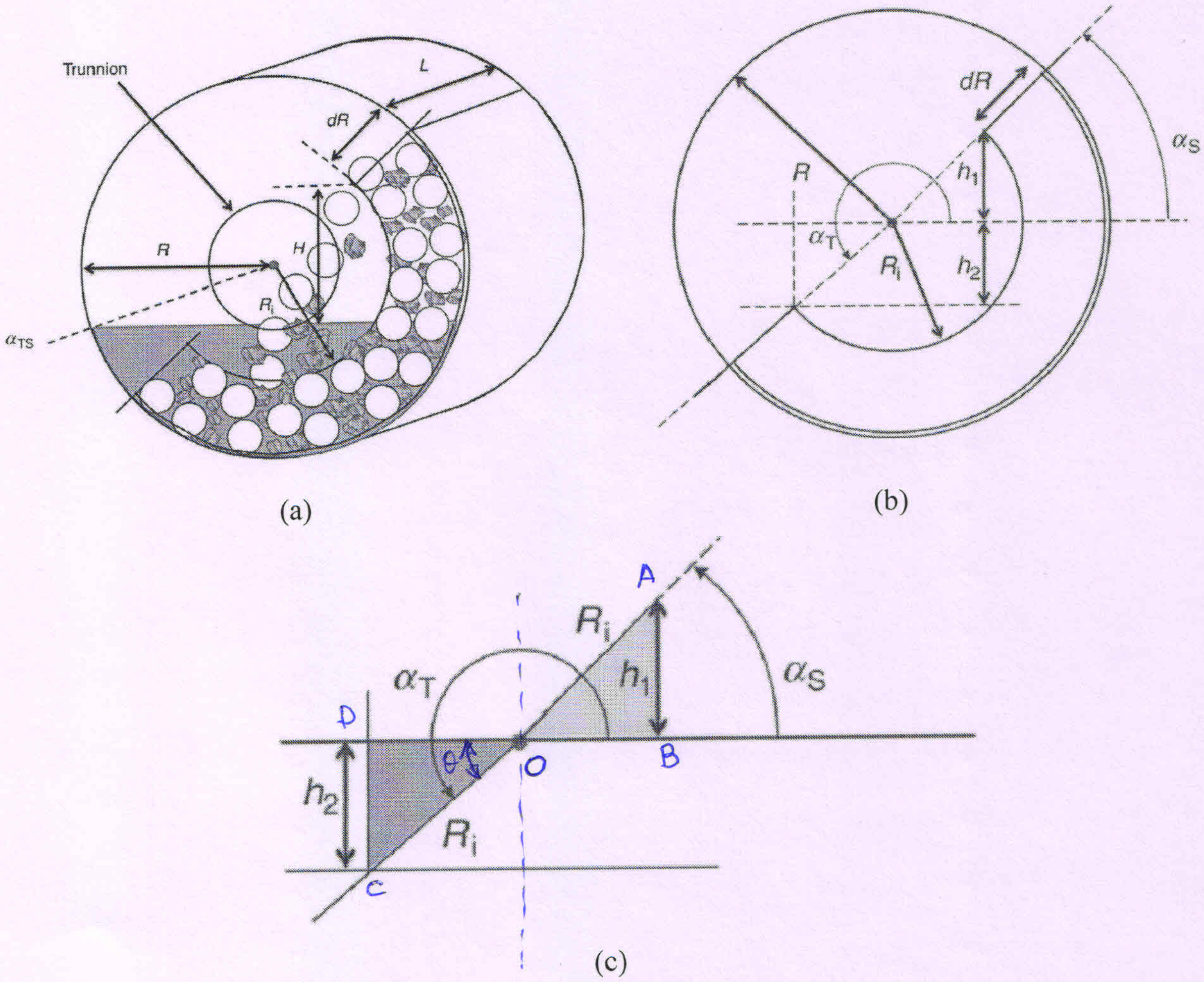

Figure 1. Position of Balls, Solids and Slurry in a Ball Mill.

from ΔAOB $h_1 = R_i \sin\alpha_S$

From the figure (c) $\angle BOC = (360^\circ - \alpha_T)$

and $\angle BOC + \angle COD = 180$

$\therefore$ $(360 - \alpha_T) + \theta = 180$ $\Rightarrow \theta = (\alpha_T - 180^\circ)$

Now from ΔOCD $h_2 = R_i \sin\theta = R_i \sin(\alpha_T - 180^\circ)$

$= -R_i \sin\alpha_T$

$\therefore$ $H = h_1 + h_2 = R_i \sin\alpha_S - R_i \sin\alpha_T = R_i(\sin\alpha_S - \sin\alpha_T)$