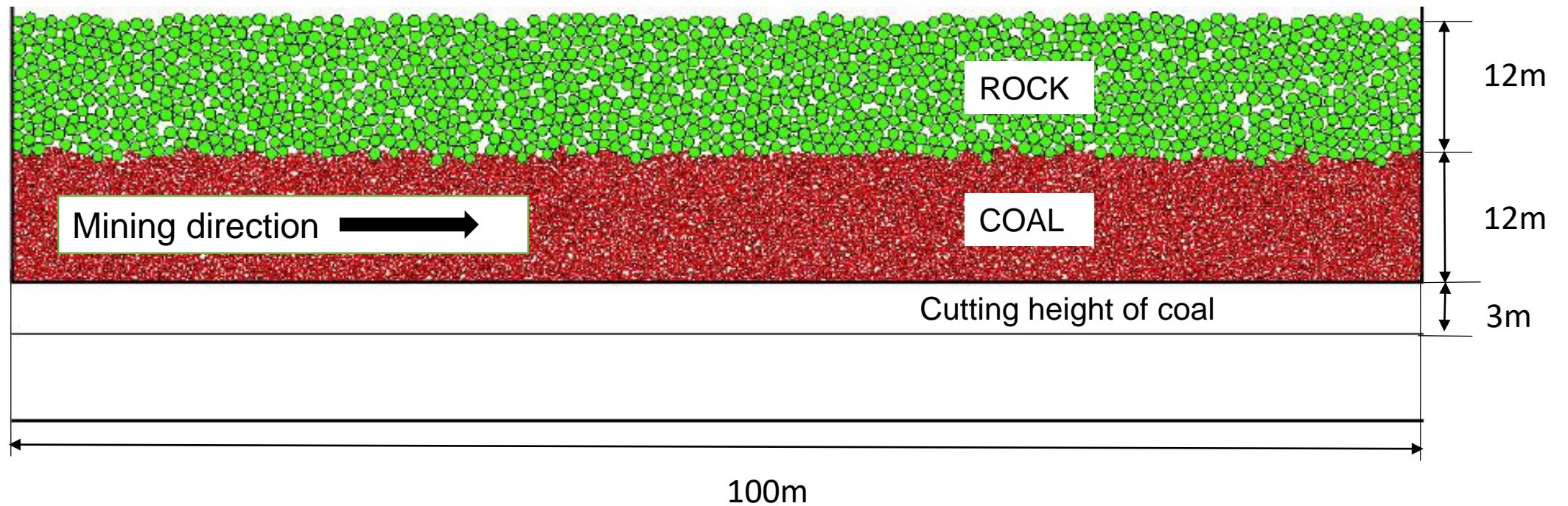
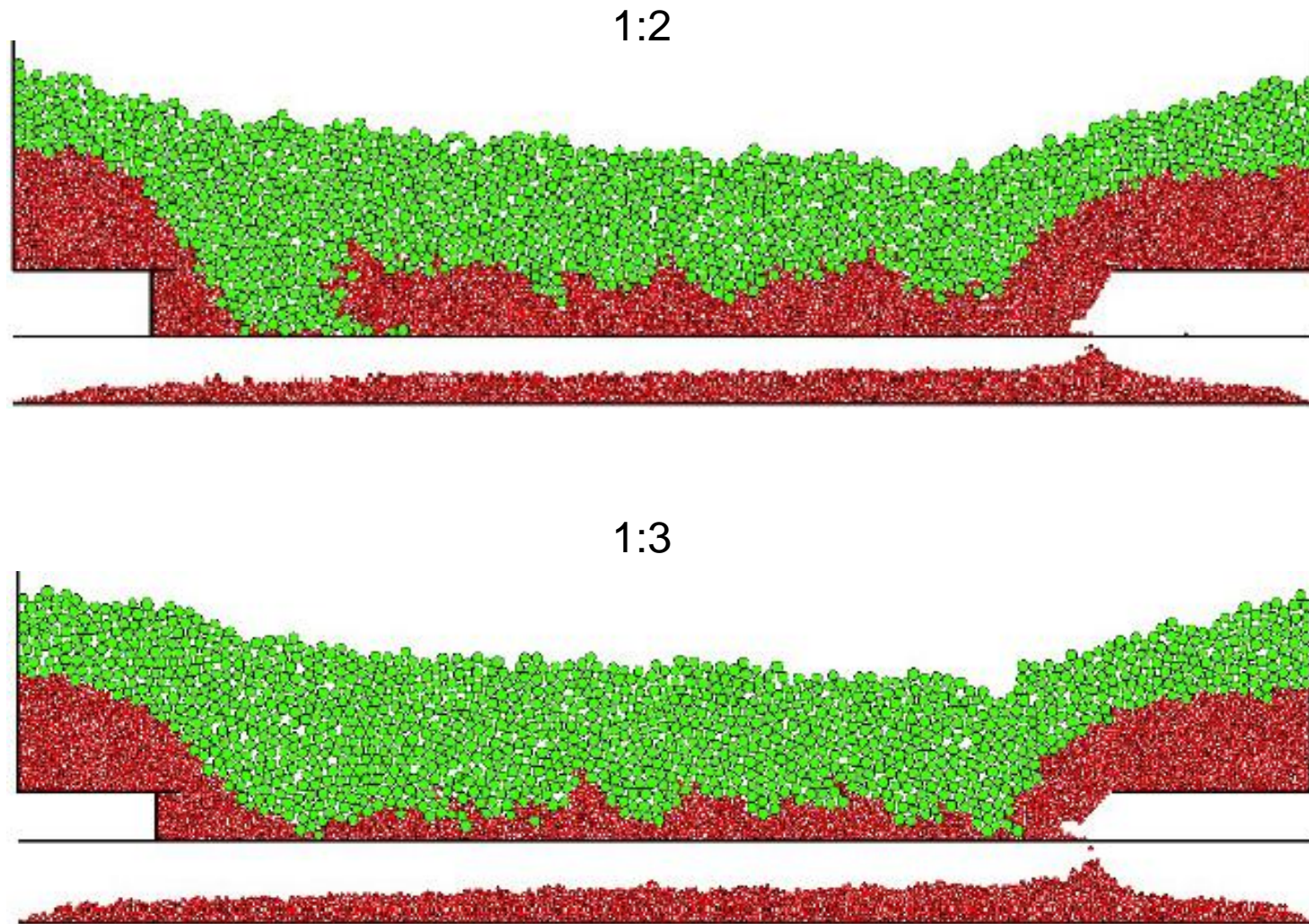


**Figure 4 (a).** PFC2D numerical model for effective caving process.

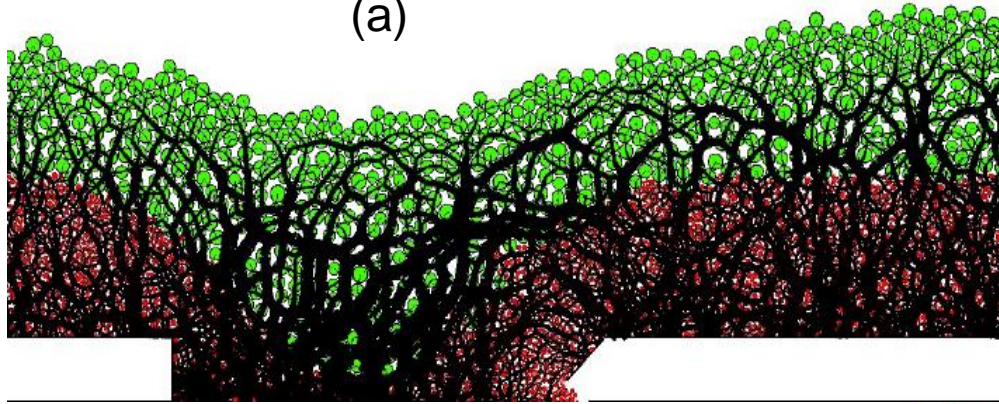


**Figure 4 (b).** PFC2D numerical model for effective caving process.

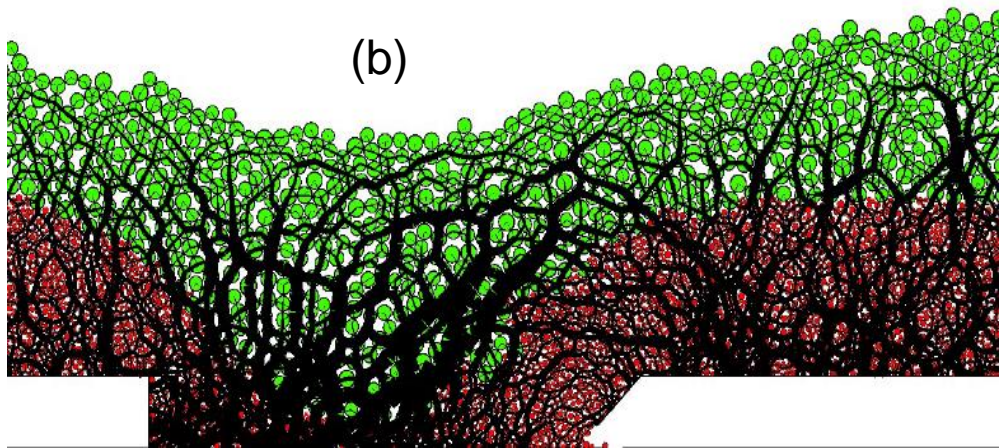


**Figure 5.** Numerical analysis at one cut with one drawing interval (0.8m).

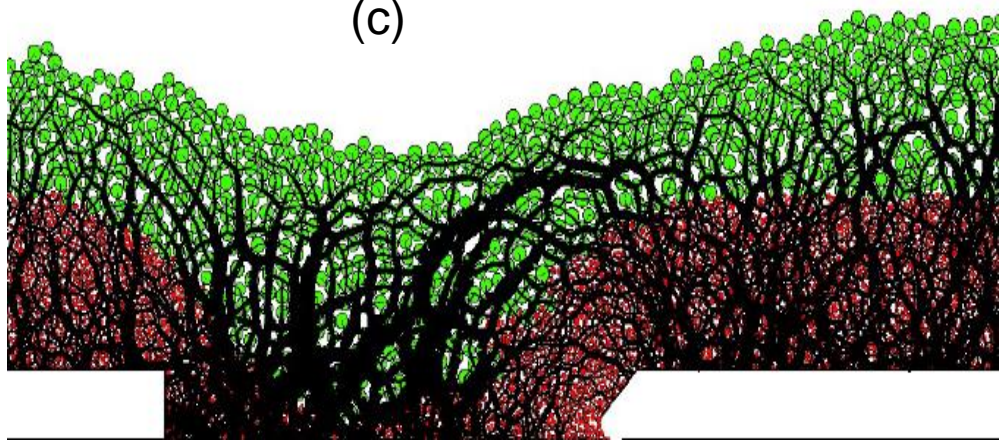
(a)



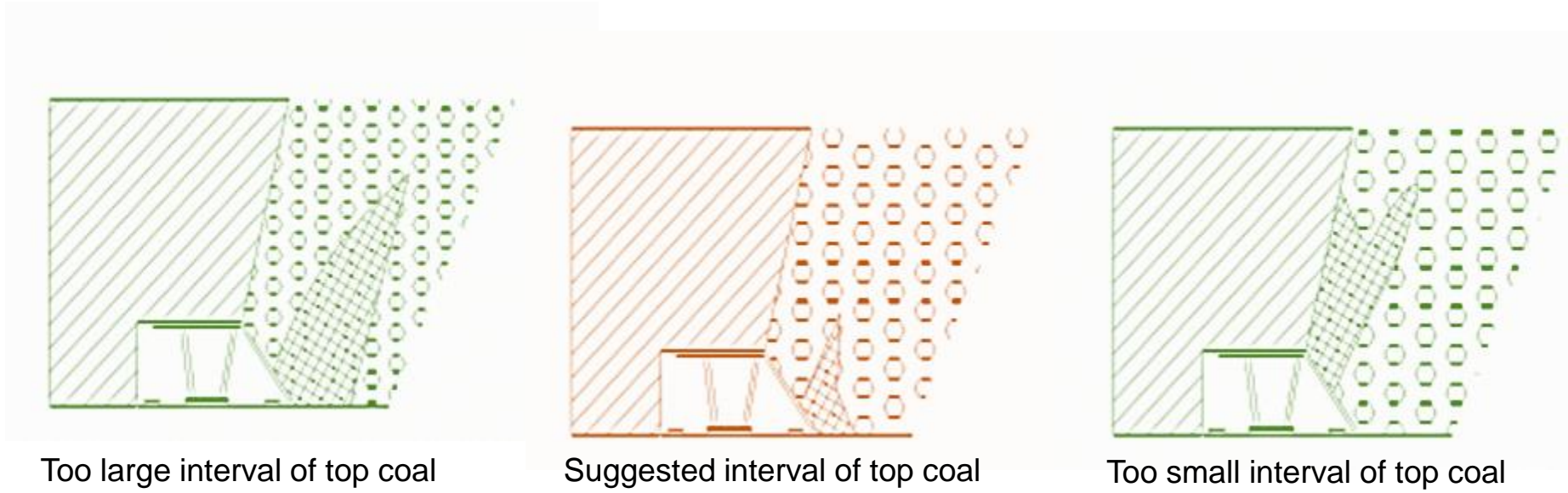
(b)



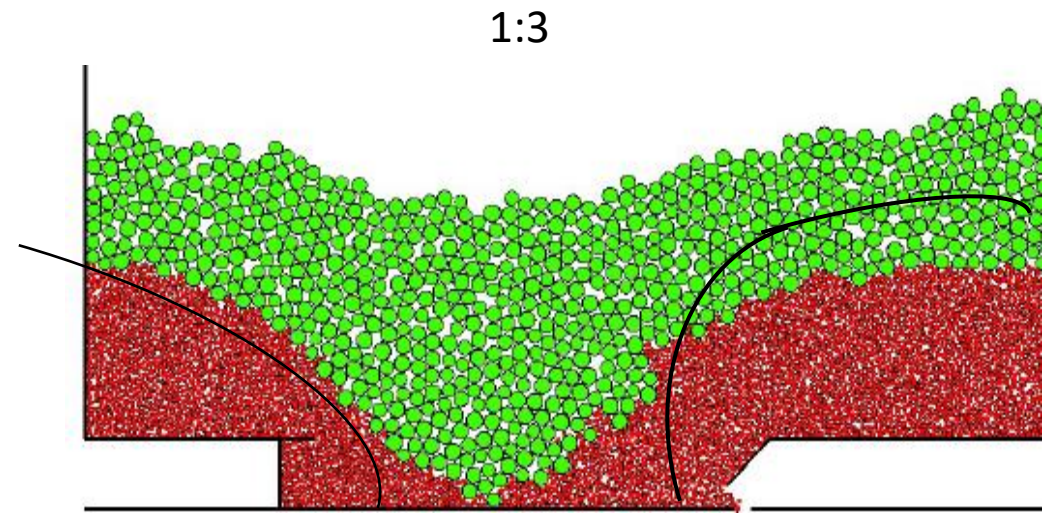
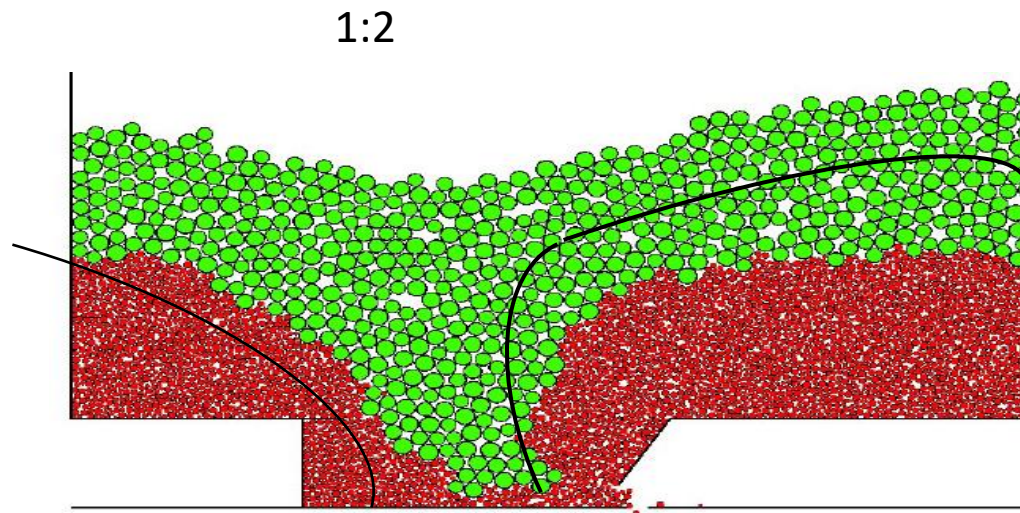
(c)



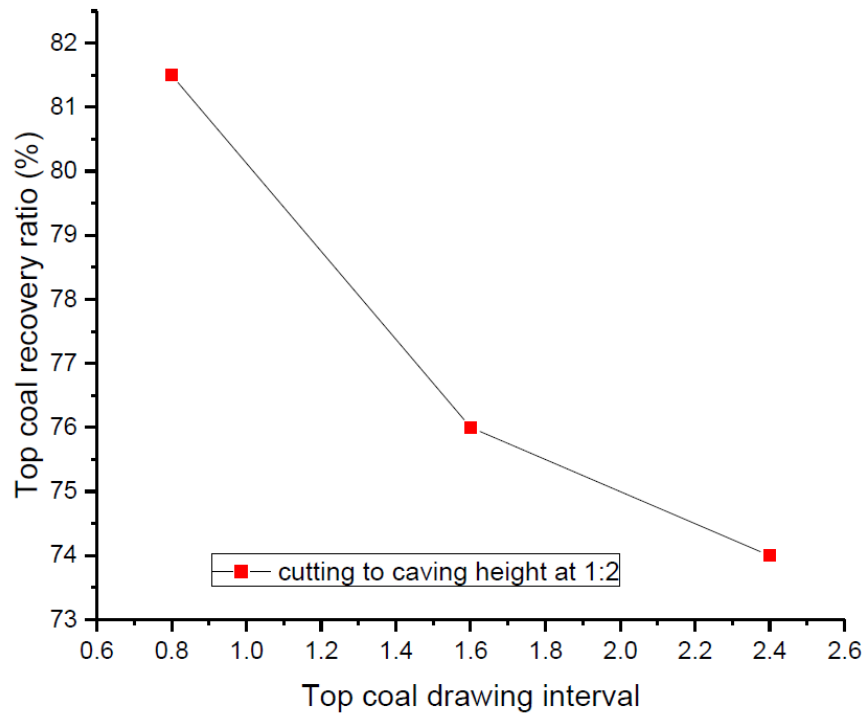
**Figure 9.** The developing of chain force during the drawing process at 1:3.



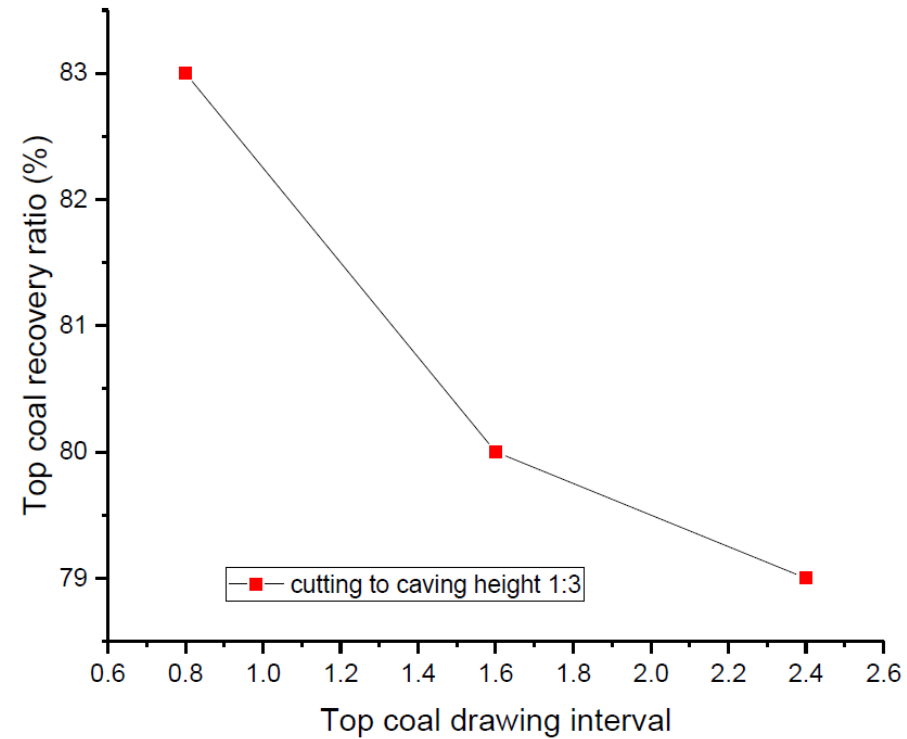
**Figure 1.** Correspondence between caving interval and top coal recovery ratio



**Figure 7 (a and b).** Interface between coal and rock at 1:2 and 1:3.



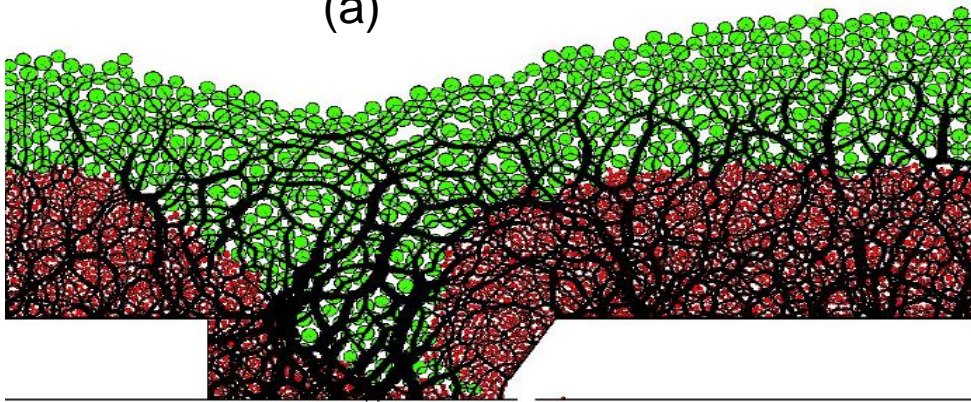
1:2



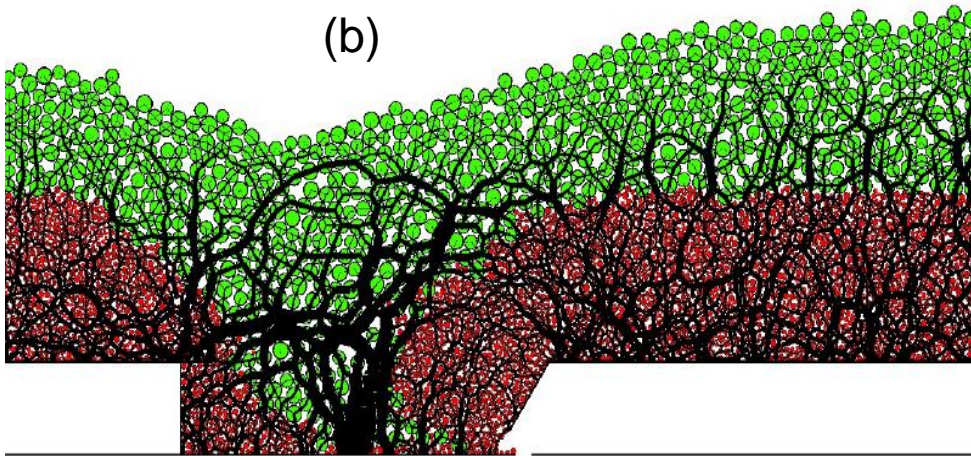
1:3

**Figure 6 (a and b).** Analysis of top coal recovery ratio.

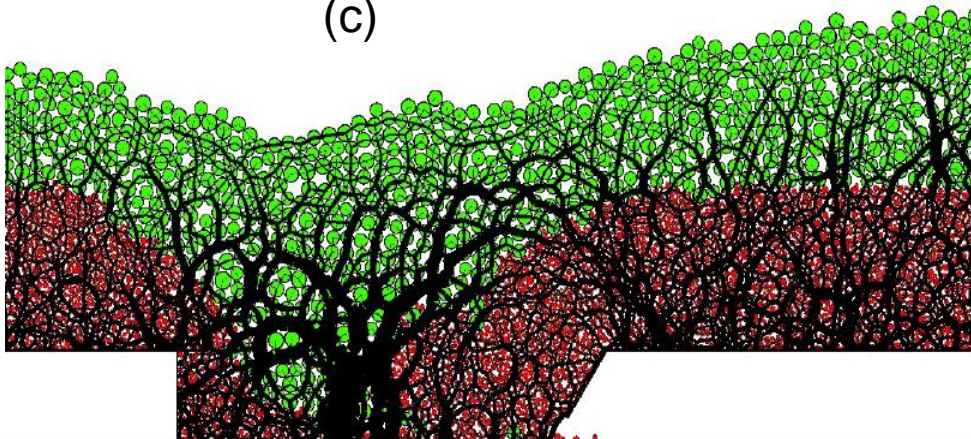
(a)



(b)



(c)



**Figure 8.** The developing of chain force during the drawing process at 1:2.