in softening and melting zone, coal is the only solid material that function as gas distributor [12]. Fig. 9 shows the MBF layer thickness of temperature higher than 1000^0C.

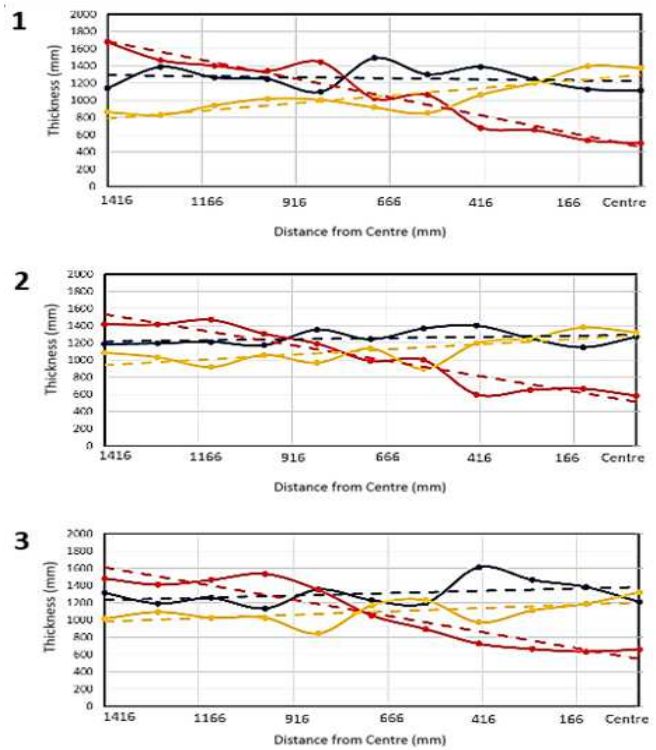

Fig. 9. Thickness of burden materials at layer 1-10

When looking at the trend graph in areas with temperatures above 1000^0C, the thickness of each burden materials in radial direction show the same conditions with the area below 1000^0C. In the center area, the thickness of the layer is dominated by dolomite particles. However variable 3 have the dominance of the lowest dolomite thickness. In addition to having the area with the least gas flow resistance, variable 3 has the largest coal thickness in radial area with a distance of 416 mm from the center. So the large gas flow will be concentrated in this area which would be distributed to upper areas. If it is compared with coke in Blast Furnace, the pressure drop increased with decreasing coke layer thickness [14].For layer thickness less than ≤ 1 m, the pressure drop will be greatly influenced by void of packed bed [15]. In this case, variable 3 has the largest void compared to other variables because of the greater portion of coal. Thus, the resistance to the gas flow is lower than that the other variables. This makes the variable 3 is estimated to have a lower pressure drop than the other variables. Therefore, when considering the area at temperatures above and below 1000^0C, variables are selected (the best) for the start-up process when considered the gas flow is variable 3.

IV. Conclusion

After analyzing the result of the simulation process, we get some conclusion. If the diameter of large bell is greater, the impact point during charging process will be closer to the wall area. Then, the impact area on the surface of the layer will be the top of the layer. Where, the most influential deformation type in the three variables is the gravity failure that is affected by the instability of the layer. The distribution of burden materials in Mini blast furnaces is influenced by large bell size, kinetic energy at impact, particle mass, and particle size and layer stability. MBF with ratio of large bell diameter and MBF inner diameter of 7: 10 (variable 3) has the largest conditioned ore fraction in the wall area and the largest dolomite fraction in the center area. The best variable for start-up process by considering gas flow is variable 3.

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