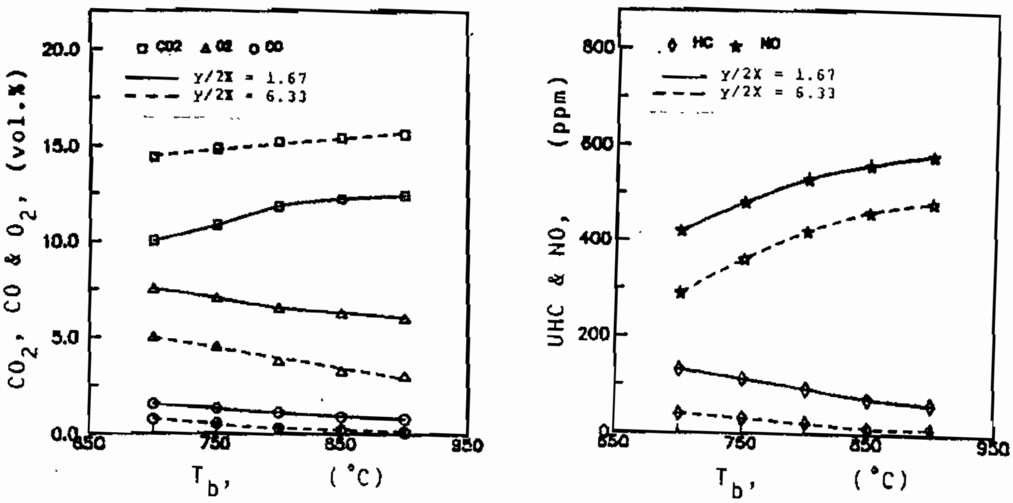


(a) CO_2 , CO & O_2 (b) UHC & NO

Fig.13 Influence of bed temperature on gas concentrations profiles at two different cross sections. (H_b=100mm, $\dot{m}_a$=810kg/h·m^2 & Φ=0.9)

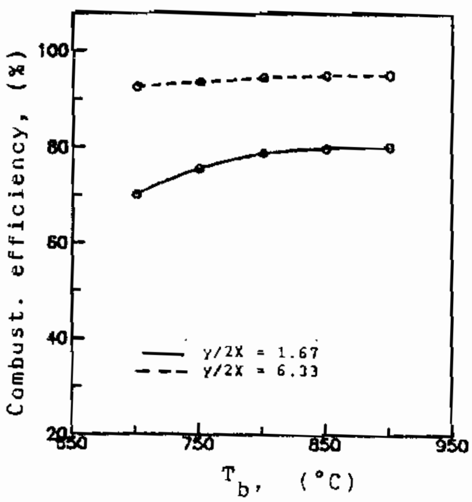


Fig.14 Influence of bed temperature on combustion efficiency. (H_b=100mm, $\dot{m}_a$=810kg/h.m^2& ϕ=0.9)

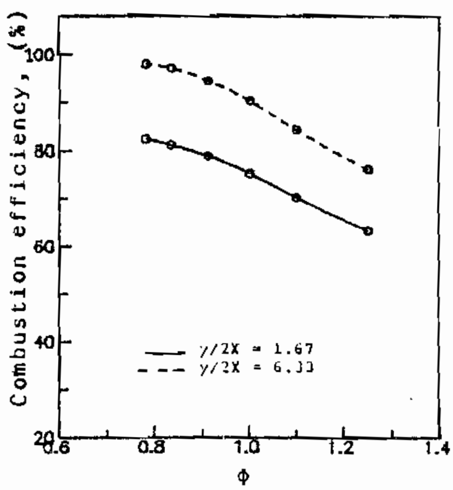
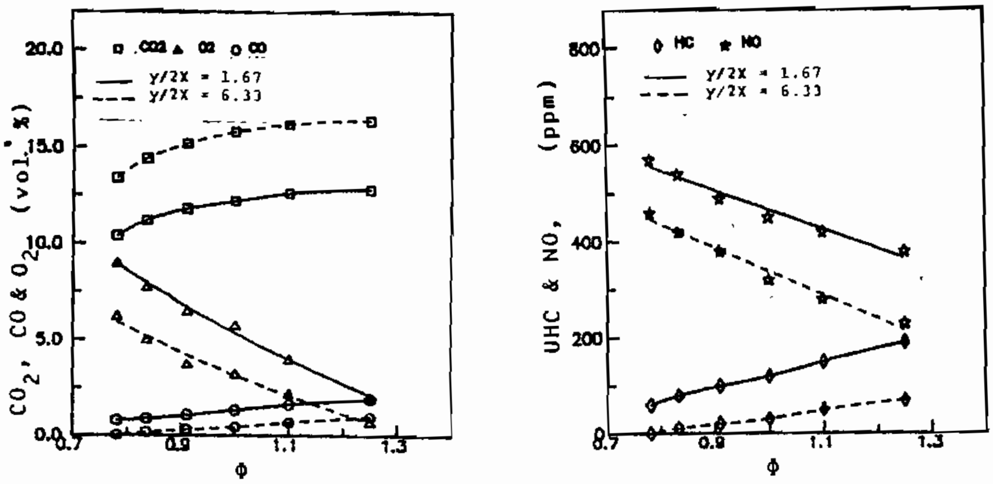
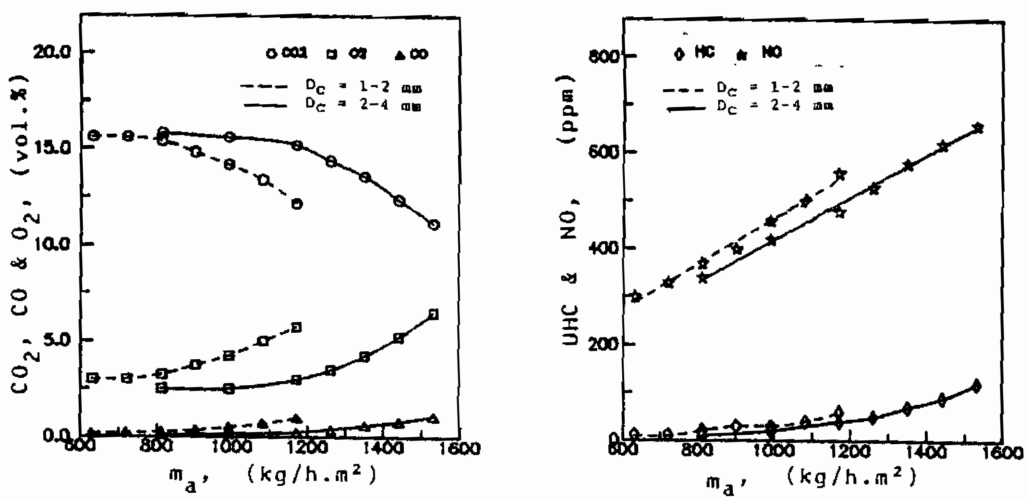


Fig.15 Influence of equivalence ratio on combustion efficiency. (H_b=100mm, T_b=800°C & $\dot{m}_a$=810kg/h.m^2)



(a) CO_2 , CO & O_2 (b) UHC & NO

Fig. 16 Influence of equivalence ratio on gas concentrations profiles at two different cross sections. (H_b=100mm, T_b=800°C & $\dot{m}_a$=810kg/h.m²)



(a) CO_2 , CO & O_2 (b) UHC & NO

Fig. 17 Influence of coal grain size on gas concentrations profiles at two different cross sections.
(H_b = 100 mm, T_b= 800°C, $\dot{m}_a$ = 810kg/h.m² & Φ= 0.9).

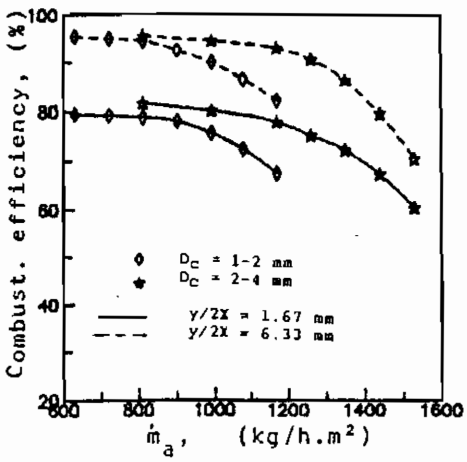


Fig. 18 Influence of coal grain size on combustion efficiency. (H_b = 100 mm, T_b = 800°C, $\dot{m}_a$ = 810 kg/h.m² & ϕ = 0.9).

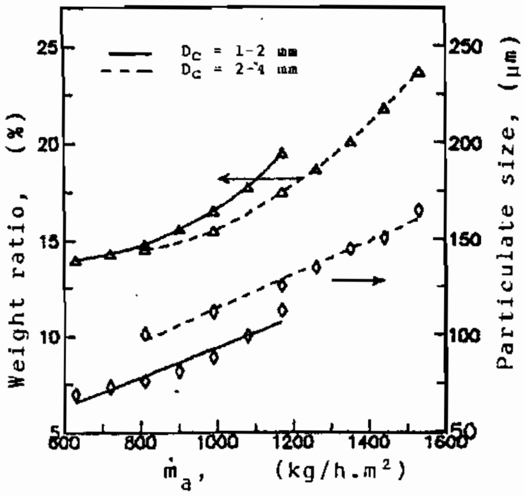


Fig. 19 Influence of coal grain size on weigt ratio and mean diameter of collected particulates (H_b = 100 mm, T_b = 800°C, $\dot{m}_a$ = 810 kg/h.m² & Φ = 0.9).

4. CONCLUSIONS

Based on the obtained results, the following conclusions may be drawn:

1. Temperature profiles in the fluidized bed zone is approximately uniform. Also, profiles of species concentrations of flue gases at the upstream of the freeboard zone are nearly uniform. This is due to the intensive mixing of the bed particles in the fluidized bed zone.
2. The freeboard height is an important parameter for coal complete combustion and for the reduction of CO, NO and UHC emissions.
3. The combustion efficiency records a good improvement with increase of bed height, decrease of equivalence ratio and with relatively larger coal grain size. Whereas, it has a significant drop with higher air flow rates. Increasing of bed temperature has a slight improvement on combustion efficiency.
4. Increasing of available gas residence time within the fluidized bed or the freeboard zone is an important parameter to improve combustion efficiency and to reduce emissions rates.
5. The largest loss of carbon is caused by the elutriation of combustible particles in the fluidized bed.
6. NO emission can be controlled by increasing each of bed height and equivalence ratio and by decreasing each of fluidization velocity and bed temperature.

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