

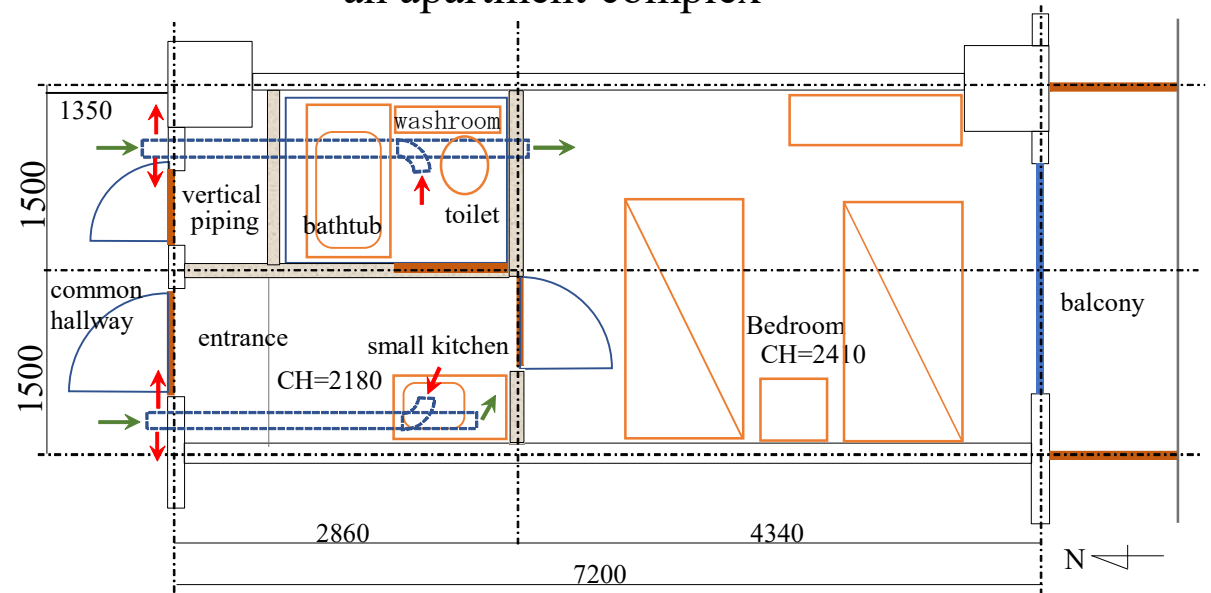
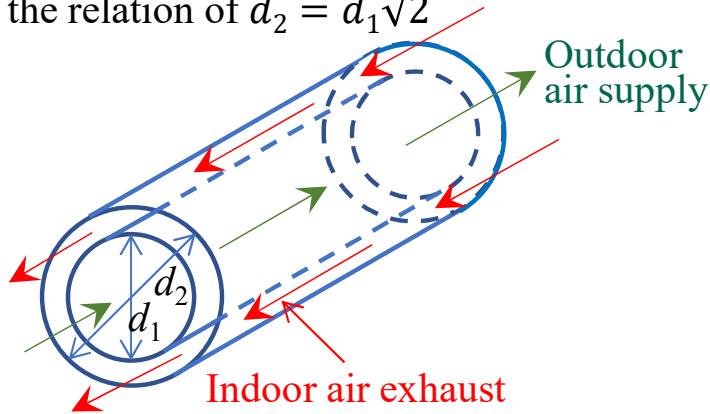
# NETS Case Study 5: Ventilation heat recovery with double ducts

Hiroyasu Okuyama, Soma Sugano, SHASE-J, Annual meeting Proceeding, 2023, [142]

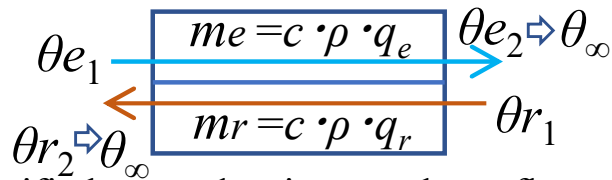
Floor plan of a hostel assuming an apartment complex

## Double duct heat recovery mechanism

For the same supply and exhaust flow rate, the diameters  $d_2$  and  $d_1$  should have the relation of  $d_2 = d_1\sqrt{2}$



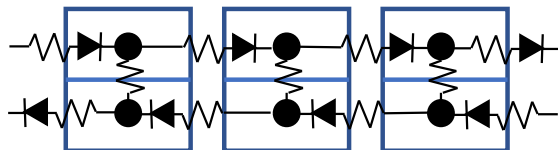
## Variables and coefficients of counter flow heat exchange



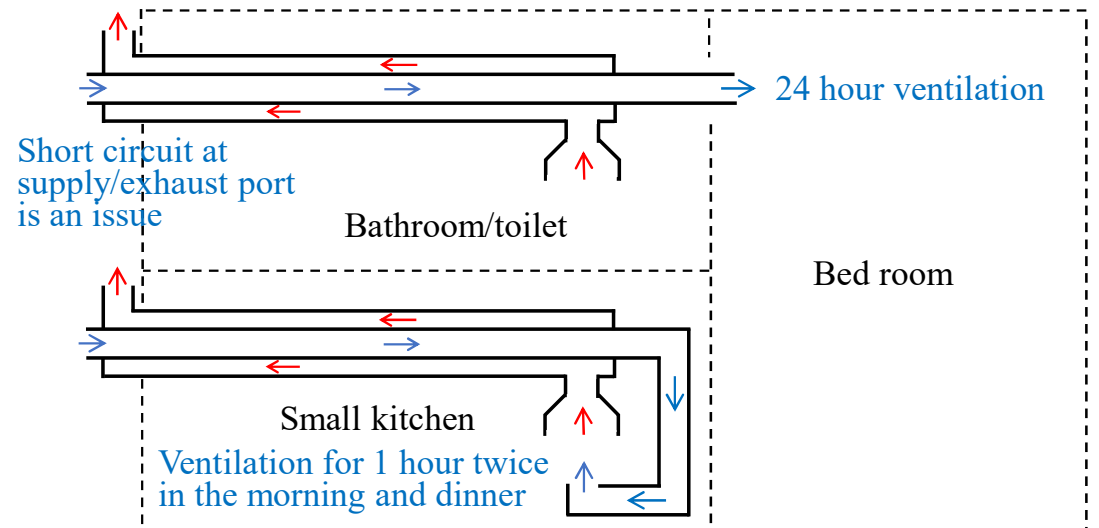
$c$ : specific heat,  $\rho$ : density,  $q$ : volume flow rate

$\theta_{\infty}$ : Ultimate outlet temperature

## Three parts model in flow direction



## Schematic diagram of the ventilation system



For total heat recovery, odor from the kitchen and steam from the bathroom might be returned.