

We report an experimental investigation of detonation propagation in a tube filled with bluff bodies. Experiments were carried out in a 6m long rectangular cross-section (112mm 107mm) tube. Firstly, the effect of an array of cube bodies (60mm 60mm 60mm) on the detonation propagation characteristics were studied. Hydrogen, ethylene and acetylene mixed with air and hydrogen-oxygen diluted with argon were used as the test mixtures. Evenly spaced photodiodes were mounted on the top wall to record the optical signals, from which the detonation velocity could be determined. Soot foils were adopted in hydrogen-oxygen-argon mixture to record the evolution of the cellular structure. The results show that the flame accelerates rapidly in the obstructed tube. The critical conditions for deflagration to detonation transition (DDT) are found to be consistent with  $L/d > 7$ , where  $L = (S + a + H)/2 / (1 - (1 - BR)^{1/2})$  is the modified characteristic geometrical size for the tube with repeated cubes and  $d$  is the detonation cell size.