Example 8.1 *A train has schedule speed of 30 kmph over a level track, distance between stations being 1 km. Station stopping time is 20 seconds. Assuming braking retardation of 3 kmph and maximum speed 25 percent greater than average speed, calculate acceleration required to run the service.*

Solution. Schedule time of run $= \frac{1}{30} \times 3600 = 120$ sec

Actual time of run $= 120 - 20 = 100$ sec

$$V_a = \frac{1}{100} \times 3600 = 36 \text{ kmph}$$

$$V_m = 1.25 \times 36 = 45 \text{ kmph}$$

Substituting various values in equation 8.3, we get

$$\frac{1}{\alpha} + \frac{1}{3} = \frac{7200 \times 1}{45 \times 45}(1.25 - 1) = \frac{8}{9}$$

$$\therefore \quad \frac{1}{\alpha} = \frac{8}{9} - \frac{1}{3} = \frac{5}{9}$$

$$\therefore \quad \alpha = \frac{9}{5} = 1.8 \text{ kmph}$$