Train Length Puzzle

(12 October 2018)

Jim Stevenson

Here is another Talwalkar problem that seems insoluble at first glance.

Solution

Figure 1 captures all the information in the problem, where L = length of the train, v = its constant speed in steps/min, r = the constant speed of the walkers A and B in steps/min, t_1 = time for the end of the train to reach walker A, and t_2 = time after t_1 for the end of the train to reach walker B.

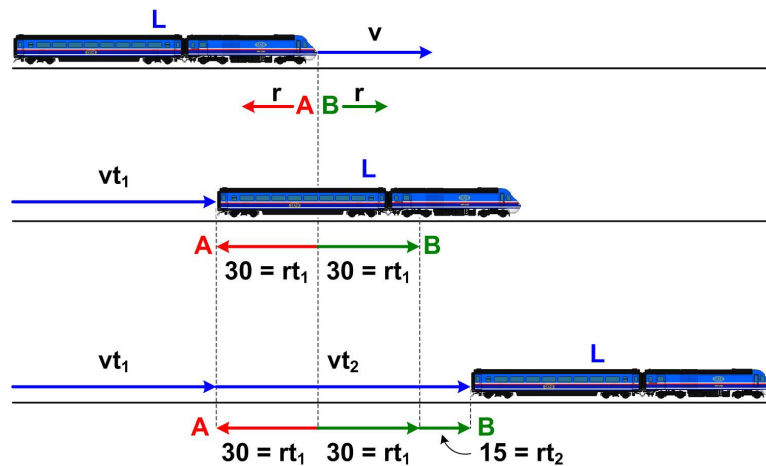**Figure 1 Problem Statement**

---

[1] https://youtu.be/VU9KenfPgo8

Therefore, we have

$$v(t_1 + t_2) = L + 45$$
$$(v/r)(30 + 15) = L + 45$$
$$L = 45(v/r - 1)$$

and

$$vt_2 = 75 \quad \text{and} \quad rt_2 = 15$$
$$(v/r)15 = 75$$
$$v/r = 5.$$

Therefore,

$$L = 45 \times 4 = 180 \text{ steps}$$