"Project Management Using Earned Value"
Case Study Solution 17.3

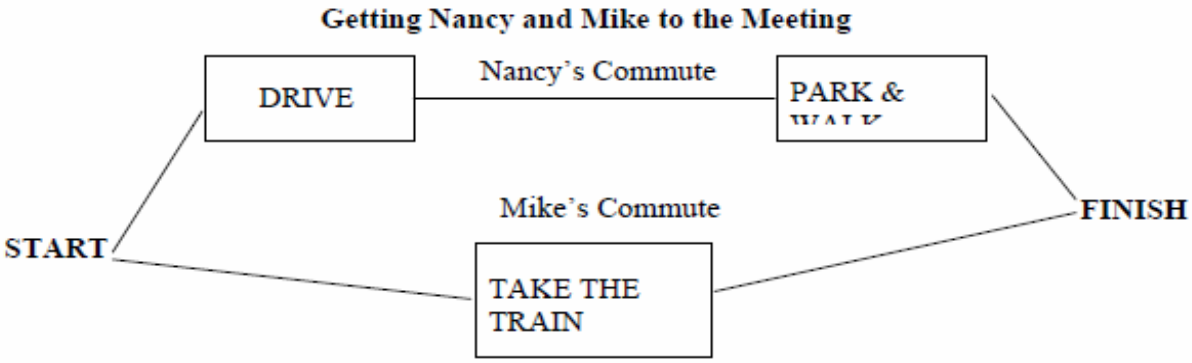
17.3

CASE STUDY

Schedule EAC and Path Convergence

Schedule EAC and Path Convergence

1. The 2-path CPM network could look like this:



2. Mike's trip is the critical path calculation using the best guess estimates:

Critical Path Using Best Guess Duration Estimates

Activity	Joe and Nancy	Mike
Drive	40	N/A
Park & Walk	15	N/A
Take the Train	N/A	70
TOTAL	55	70

3. Based on best guess durations, Bob should call Mike at 7:20, or maybe a little before, to be sure he is leaving the house.

4. Nancy's trip is the critical path using average durations:

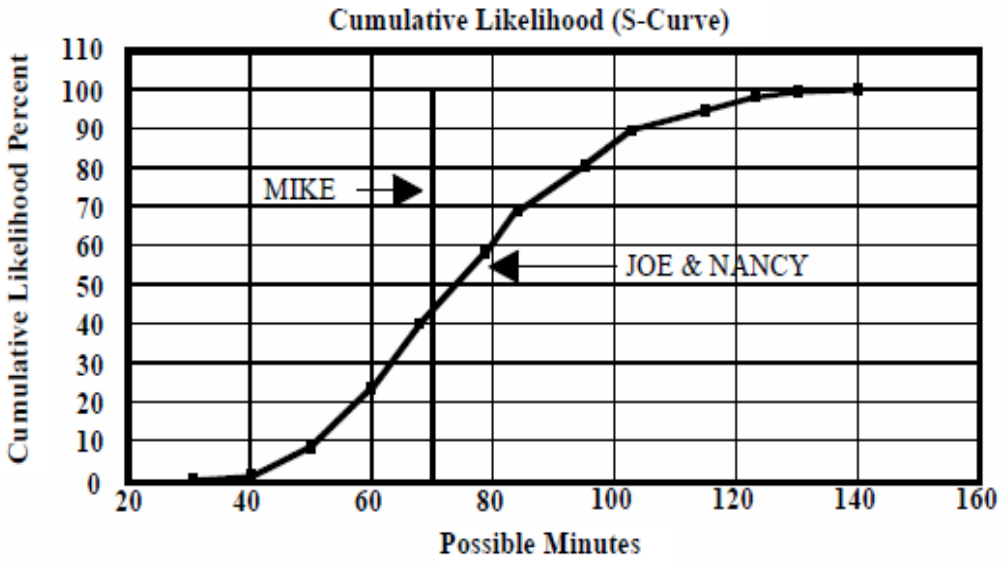
Critical Path Using Average Duration Estimates

Activity	Joe and Nancy	Mike
Drive	60.5	N/A
Park & Walk	15.0	N/A
Take the Train	N/A	70
TOTAL	75.5	70

Now, Bob should call Nancy a little before 7:15 a.m.

5. The graph that compares the risk involved in Joe and Nancy's trip with Mike's is below. Note that Mike's trip is assumed to have no vacation, so his S-curve is reduced to a vertical line.

DRIVE, PARK & WALK PATH



6. If they start at the same time, Joe and Nancy's trip has a significant risk of taking longer than Mike's. Mike's trip is not even relevant if you want to gain any confidence over about 45% (55% chance of overrun or less).

   Using the sum of the best guess estimates, Mike's trip is the critical path. Adding average activity duration estimates, Joe and Nancy's trip is 'critical'.

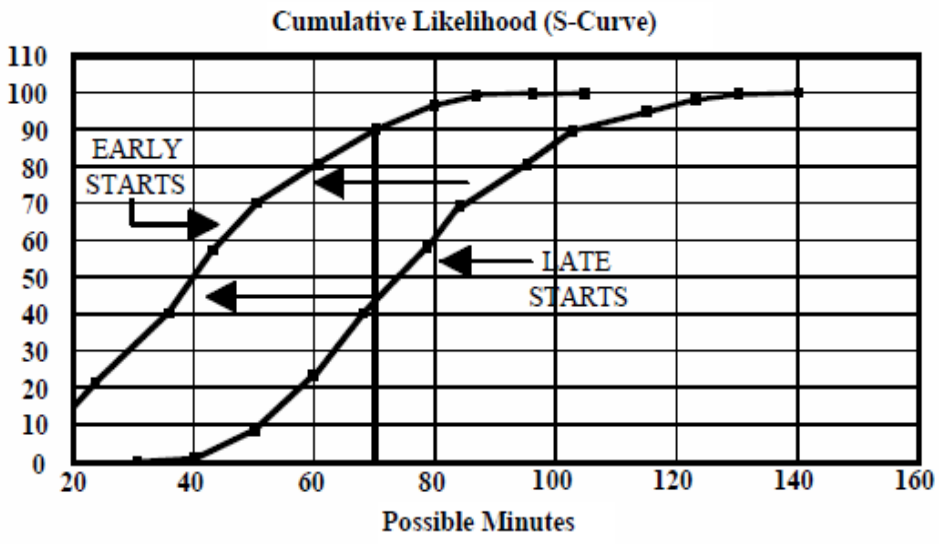
   Certainly, Joe and Nancy's trip is the highest risk path.

7. Bob should call Nancy first, as early as 6:56 a.m., to get her there with only a 10% chance of being late. More latitude would imply a later phone call, more certainly an earlier one.

   Notice that by leaving at 6:56, with good luck, Nancy might get to work almost an hour early. She is very unlikely to arrive late, however, and there are severe penalties for late arrival.

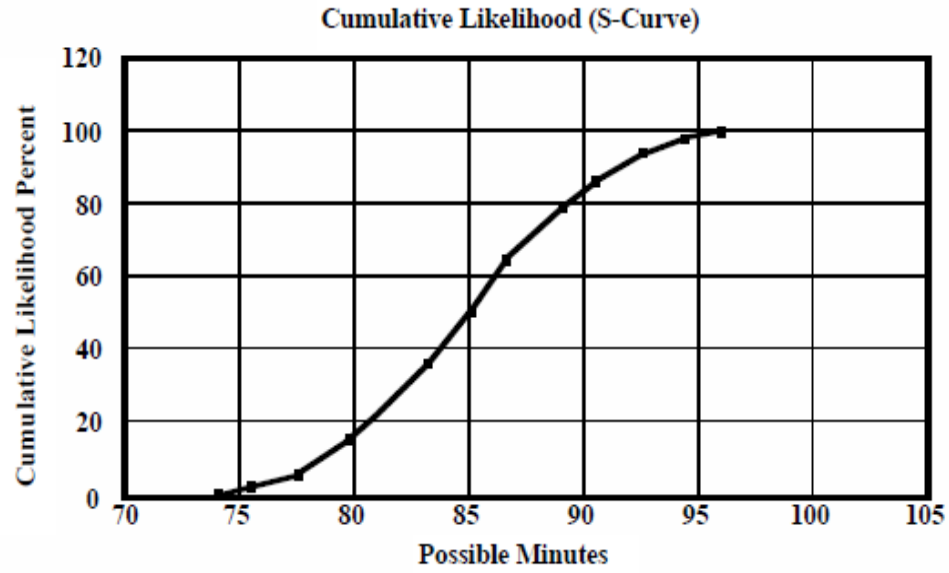
8. Early starts will shift Nancy's EAC distribution to the left so that she is 90% likely to arrive at or before Mike does, at 8:30 a.m.

DRIVE, PARK & WALK PATH



9. If Joe and Nancy take surface streets, their path EAC distribution is the sum of the distribution of the Park & Walk Activity and the (presumed) fixed commute duration of 75 minutes. Shift the 'Park & Walk' distribution to the right on the X-axis by 70 minutes for the (certain) surface option:

DRIVE SURFACE STREETS, PARK & WALK PATH



9. (continued)

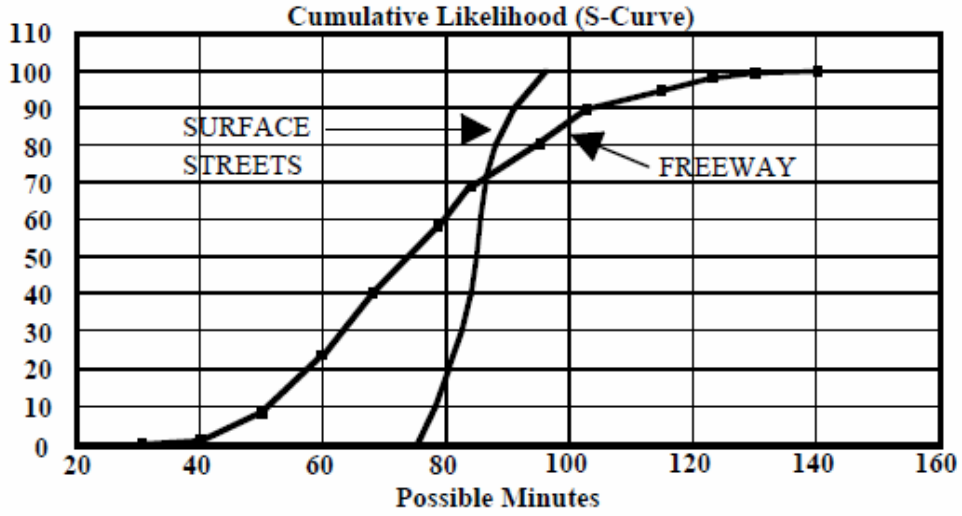
The table of X and Y values for the contingency plan is below:

Joe and Nancy Getting to Work

Drive Surface Streets
Park & Walk Path

Cumulative Likelihood	Minutes	Minutes	Cumulative Likelihood
10	79	75	1
20	81	80	15
30	83	85	50
40	84	90	85
50	85	95	99
60	86		
70	87		
80	89		
90	91		
95	93		

10. The S-curve for the surface street contingency plan is more vertical, but it lies to the right of much of the freeway option curve. The surface street strategy cuts off the long tail, however, and would be an attractive option if great certainty were required, e.g. the Wednesday Meeting.



11. The surface street plan takes 70 minutes, 30 minutes longer than the best guess freeway time and nearly 10 minutes longer than the 60.5 minutes average freeway duration. In this way, it 'costs' Joe and Nancy more time.

    What the surface street plan does, however, is to 'cut-off the tail' of the activity distribution. It avoids a disastrously-late arrival, which could be important in the event of an important Wednesday meeting.

12. The new estimate should probably have a longer best guess and average duration for Driving, Parking and Walking. It may also have a significantly longer right-hand tail, indicating that the likelihood of truly terrible traffic increases, perhaps geometrically, with the density of the traffic.