5.7: Schedule Compression Techniques

While resource leveling is mostly implemented during the planning stage of activities, schedule compression techniques such as crashing and fast-tracking are utilized during the execution of activities to accelerate the project. With crashing, the project manager adds additional resources to the critical activities (zero-slack activities) and saves time by spending more money on the additional resources. In this technique, existing resources can be asked to work overtime or we can add new resources. As seen in Figure 5.4, we assigned new resources to the three activities. With the added resources, and accordingly with more cost, we now had the opportunity to finish these activities in 8 days instead of 12 days.

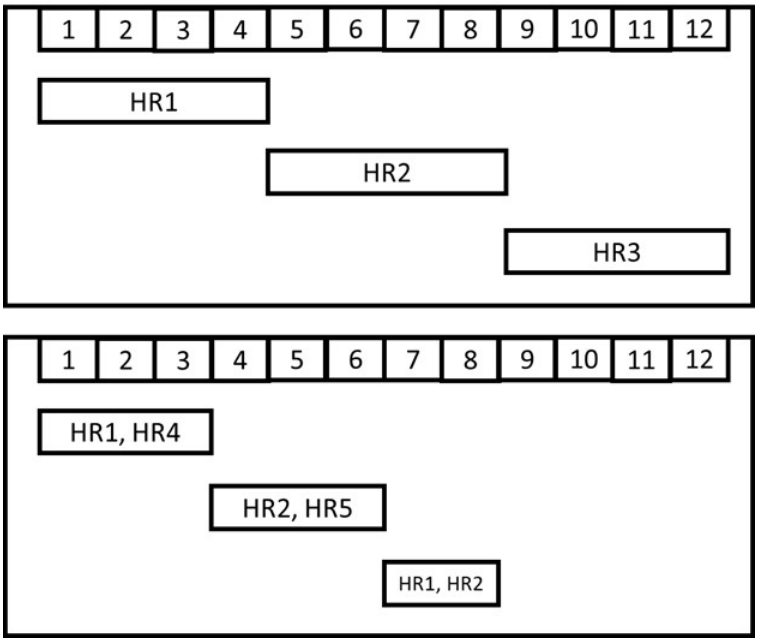

Figure 5.4: Crashing

Project managers should ponder all the alternatives and outcomes before deciding on crashing since adding new resources may not shorten the duration all the time. If overtime is approved, people who work overtime may be less productive after a while with increased tiredness and less satisfaction. Besides, there may be internal and external dependencies. For example, we may be still waiting for a material ordered from a supplier which cannot deliver earlier. Regarding the equipment, we may not be able to increase the operating time if the equipment cannot work more than a certain number of hours a day. If the activities in which we crash resources are not critical, we cannot shorten the duration. Let's consider the project activity network diagram in Figure 5.5.

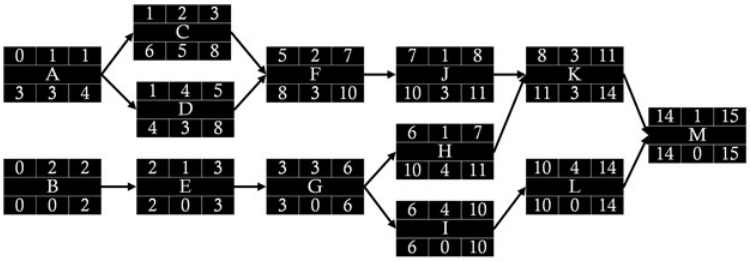

Figure 5.5: Activity Network Diagram

Let's perform crashing in Activity D and Activity K. Each of D and K has a three-day slack. Let's assume that with additional resources, we can finish D in 3 weeks instead of 4 weeks, and the K in 1 week instead of 3 weeks. The new activity network diagram is in Figure 5.6. The total duration of the project remains the same, 15 weeks. D and K, the both, have one more day slack while it hasn't influenced the project duration. Therefore, we have just paid more for nothing.

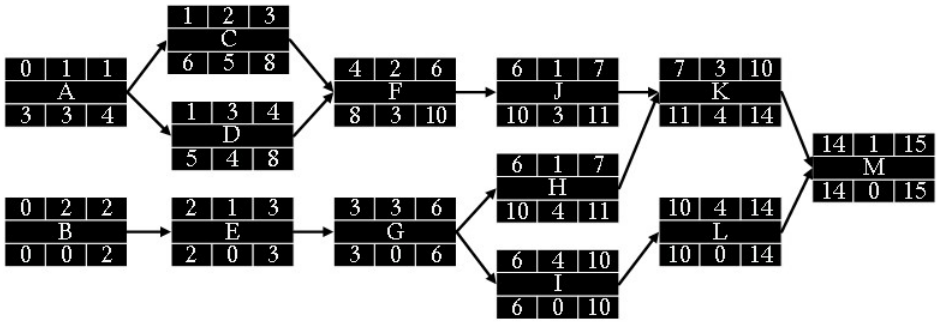

Figure 5.6: Activity Network Diagram after Crashing D and K

If we crash critical activities, we can save time on the project. Let's add new resources to Activity I and Activity L. The new duration for I and L is 3 weeks for each. As seen in Figure 5.7, the total duration of the project was reduced to 13 days from 15 days.

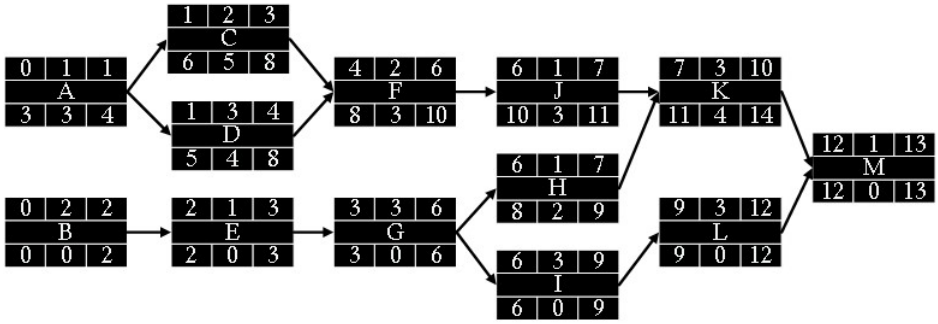

Figure 5.7: Activity Network Diagram after Crashing I and L

Another option to shorten the duration of a project is to implement fast-tracking. If some parts of the activities can be carried out in parallel, we can shorten the total duration. Let's use the example in Figure 5.4. In fast-tracking, we don't assign new resources. With the same resources, we can execute some parts of three activities in parallel. Let's assume that the first activity is coding and HR1 is working in this activity. The second activity is testing and HR2 is working in this activity. We don't need to wait for the first activity to be completed to start the second activity. We can add two-day leads (negative lags) between activities (Figure 5.8). After developers finish some of the codings, testers can start the testing. In this case, we can finish three activities in 8 days instead of 12 days as seen in Figure 6.8. However, using leads increases the coordination efforts. Therefore, the project manager should exert more concentrated efforts for coordination to prevent any quality risks. It may be still possible to increase the project costs although the probability is less when compared with crashing. It is of high importance to bear in mind that not all activities can be fast-tracked. The sequencing of the activities should be such that fast-tracking is permissible.

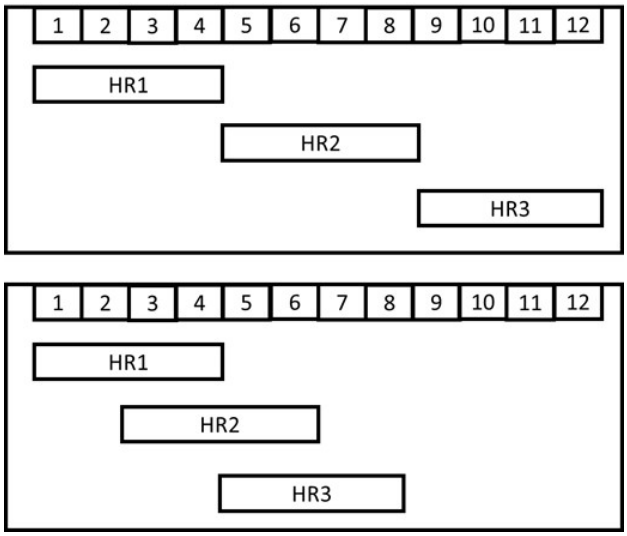

Figure 5.8: Fast Tracking