**Critical Path Analysis – Revision Notes**

*“A planning technique that identifies the individual tasks of a project, places them in the correct sequence and allows for identification of the critical path.”*

**(1) Parts of the Diagram**

**Arrows**

* Show activities
* Must go left to right
* Begin and end with a node
* Length is not important

**Nodes**

* Represent the start and end of an activity

**Earliest Start Time (EST)**

**Node Number**

**Latest Finish Time (LFT)**

**Rules**

* All diagrams will start and end with a node
* There is no limit to the number of activities that link to a single node
* Line must not cross

**Calculating the Latest Finish Time (LFT)**

* Work from Right to Left
* LFT = LFT at the end of following activity – Duration of following activity
* If 2 activities lead into a node, then use the LOWEST value.

**Calculating the Earliest Start Time (EST)**

* Work from Left to Right
* EST = EST of previous activity + duration of previous activity
* If 2 activities lead into a node, then use the HIGHEST value.

**The Critical Path**

The Critical Path consists of those activities that have no float or spare time. In other words if they are delayed the entire project will fall behind. When you draw network diagrams you will always be asked to label the critical path. The easiest way to do this is:

* Look for the nodes that have the same EST and LFT.
* If there is more than one activity linking into a node, then look at the “chain,” of activities, the one that takes the longest is the critical path.

**(2) How to Draw a Network Diagram**

1. Sketch the network in pencil, don’t worry about the EST and LFT at this point.
2. When you are happy with the “look,” of the diagram, draw a “best one,” take a whole page.
3. Label each activity and add its time duration.
4. Number of the nodes left to right.
5. Write a zero in the EST and LFT on node 1.
6. Work from left to right filling in the EST for each node.
7. In the final node copy the EST into the LFT.
8. Work from right to left filling in the LFT for each node.
9. Label the Critical Path

**(3) Analysis and Evaluation**

|  |  |
| --- | --- |
| **Benefits**  | **Limitations**  |
| Encourages forward planning  | Based on assumptions, do you really know how long each task will take? (reliability of data)  |
| More efficient use of resources  | Does not guarantee the smooth running of a project. **Good operations and human resource management is still required.** |
| Can help with cash flow; capital and labour is only paid for when it is needed.  | Computer programs are needed for massive or complex projects.  |
| Reduces total time of a project  |  |
| Easy to interpret, can help to simplify complex problems |  |
| Can aid in “Time Based Management.” |  |
| Can Help gain “First mover advantage.” |  |

**What should you do if an activity falls behind?**

* Think is it critical? (Or does it become critical?) If no, then it is not too much of a problem.
* Allocate resources from non-critical activities
* Hire extra labour or capital
* Use of overtime, other financial incentives
* Possible discussion of Theory X or Y management techniques?