1. Construction Planning for Site preparation and Foundation Work

Suppose that a site preparation and concrete slab foundation construction project consists of nine different activities:

A. Site clearing
B. Removal of trees
C. General excavation
D. Grading general area
E. Excavation for utility trenches
F. Placing formwork and reinforcement for concrete
G. Installing sewer lines
H. Installing other utilities
I. Pouring concrete

The construction relationships between these nine activities are as follows.

• Activities A and B do not have preceding activities since they depend on none of other activities.

• We assume that activities C and D are preceded by activity A.

• Activities E and F cannot begin until the completion of activities B and C.

• Activity E is a preceding activity for activities G and H.

• Activity D is also preceding activities G and H.

• Activity I (pouring concrete) cannot begin until the sewer line is installed and formwork and reinforcement are ready, so activities F and G are preceding.

• Other utilities are routed over the slab foundation, so activity H (installing other utilities) is not a preceding activity for activity I (pouring concrete).

Please draw a network precedence diagram (using activity-on-node or activity-on-branch method) to represent the construction result of our planning for the site preparation and foundation work.

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2. A road construction project (with a length of 100 units) includes the following activities: "rough grading", "finish grading", "aggregate base", "5-inch concrete paving", "9-inch concrete paving", and "curbs". Figure 1 is a velocity diagram for the project, where the x-axis represents the time and the y-axis represents the units of production. Suppose that the construction proceeds exactly the same as scheduled. Please describe the construction status on the end of the 12th week by sketching the section (剖面图) of the entire road. Figure 2 provides an example of section drawing for the construction status on the end of the 22nd week (at project completion).

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3. Please describe the process of balanced cantilever method (平衡懸臂工法) for the construction of a bridge superstructure by drawing its activities using precedence diagramming method (i.e., activity-on-node method), which is a network diagramming technique commonly used in critical path method analysis.

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