محاضرة المهندس/ سعيد النجار

يناير ١٩٩٤

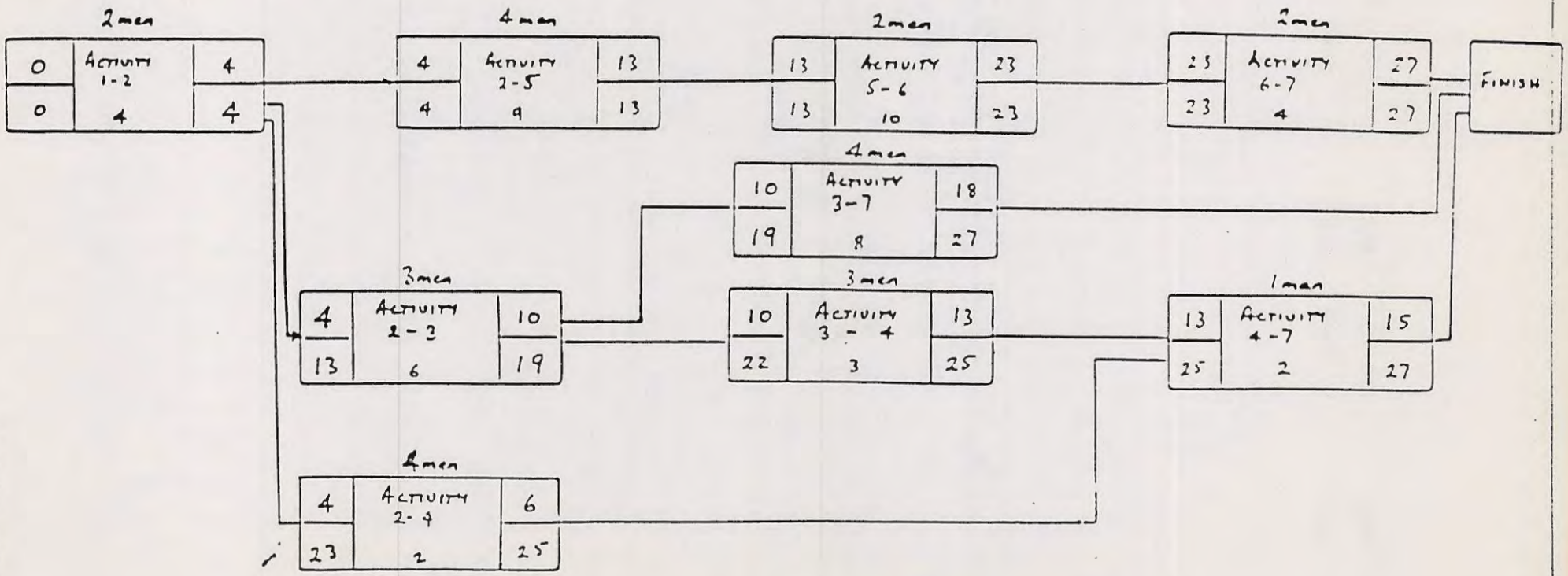
EXAMPLE IN RESOURCE SMOOTHING AND RESOURCE LEVELLING.

Given the precedence diagram below - with the labour resources as shown

Produce a labour chart based on all activities starting as soon as possible and as late as possible.

What resource smoothing is possible?

If the number of men is absolutely restricted to 6, and no activity can be carried out without the correct number of men, what is the effect on the perfect finish date?



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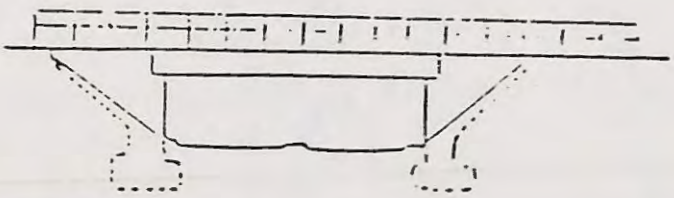
PROBLEM

As part of an overall motorway ~~construction~~ project, a side road has to be directed on to the new bridge which will go over the motorway. You list the activities and estimated durations for the construction of the bridge as follows.

10	Construct precast concrete beams - off site	10 wks
20	Excavate for N abutment	4 wks
30	Excavate for S abutment	3 wks
40	Construct N abutment	8 wks
50	Construct S abutment	6 wks
60	Grade N approaches	6 wks
70	Grade S approaches	6 wks
80	Erect precast concrete beams and construct in-situ slab	5 wks
90	Surfacing & parapets etc. on bridge and approaches	2 wks



Draw networks (activity on the ~~arrow and~~ precedence) to keep the construction time a minimum assuming

i) Excavation on both abutment may occur simultaneously.

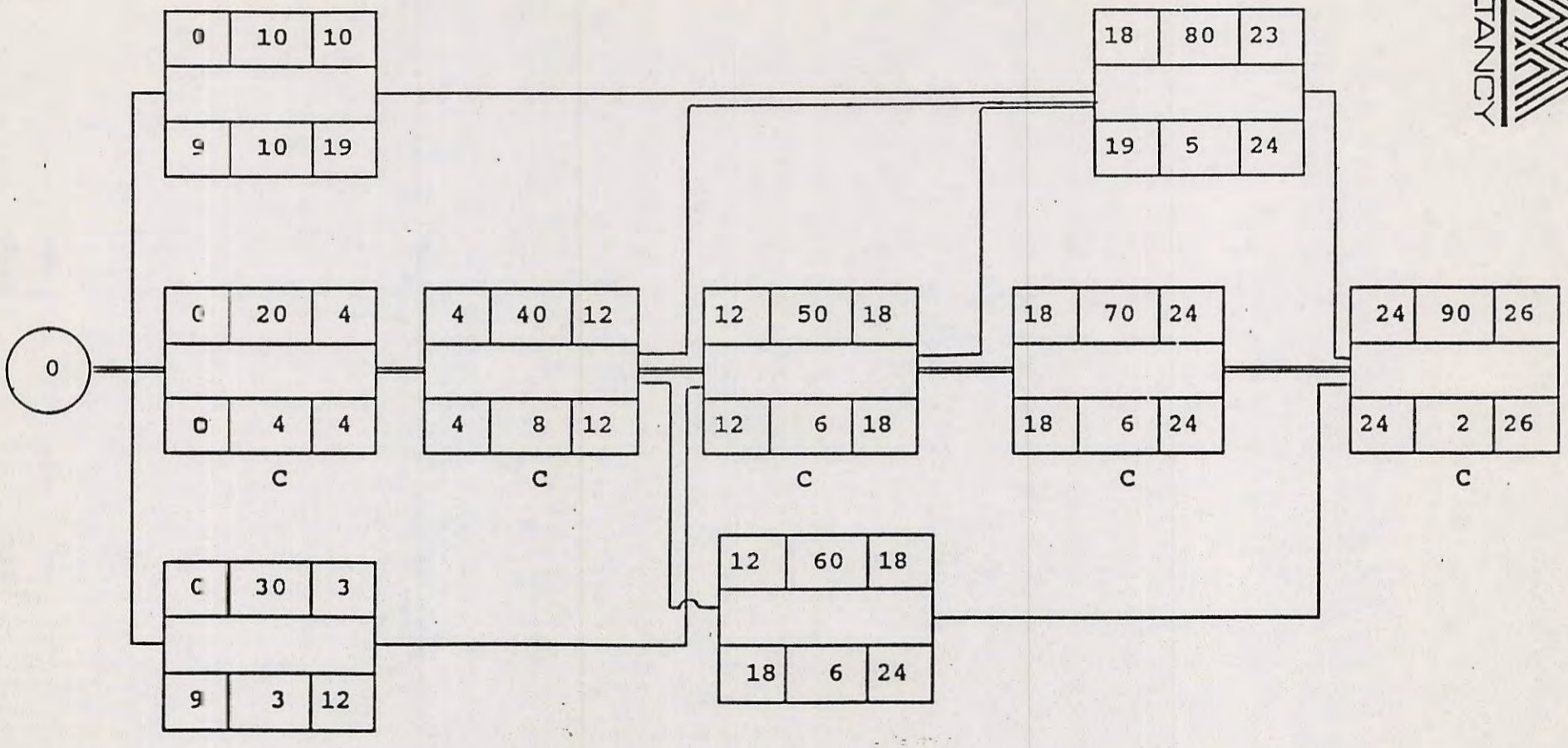
ii) Grading on N and S approaches may occur simultaneously but can not start until the respective abutment is complete.

iii) Construction of the N and S abutments can not occur simultaneously as the same formwork is to be used for both abutments.

Find the critical path and the minimum construction period. How much time could be saved by using an extra set of formwork ? Would having the time on the approaches by doubling the plant be as effective?

(25 wks, 6 wks, No, only 1 wk. saved)

CASE I



Critical Path

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CASE (I)

ONE SET OF FORM WORK

ACT. NO.	DESC.	DUR. WKS.	PREC. ACT.
10		10	--
20		4	--
30		3	--
40		8	20
50		6	30&40
60		6	40
70		6	50
80		5	40,50&10
90		2	60,80&70

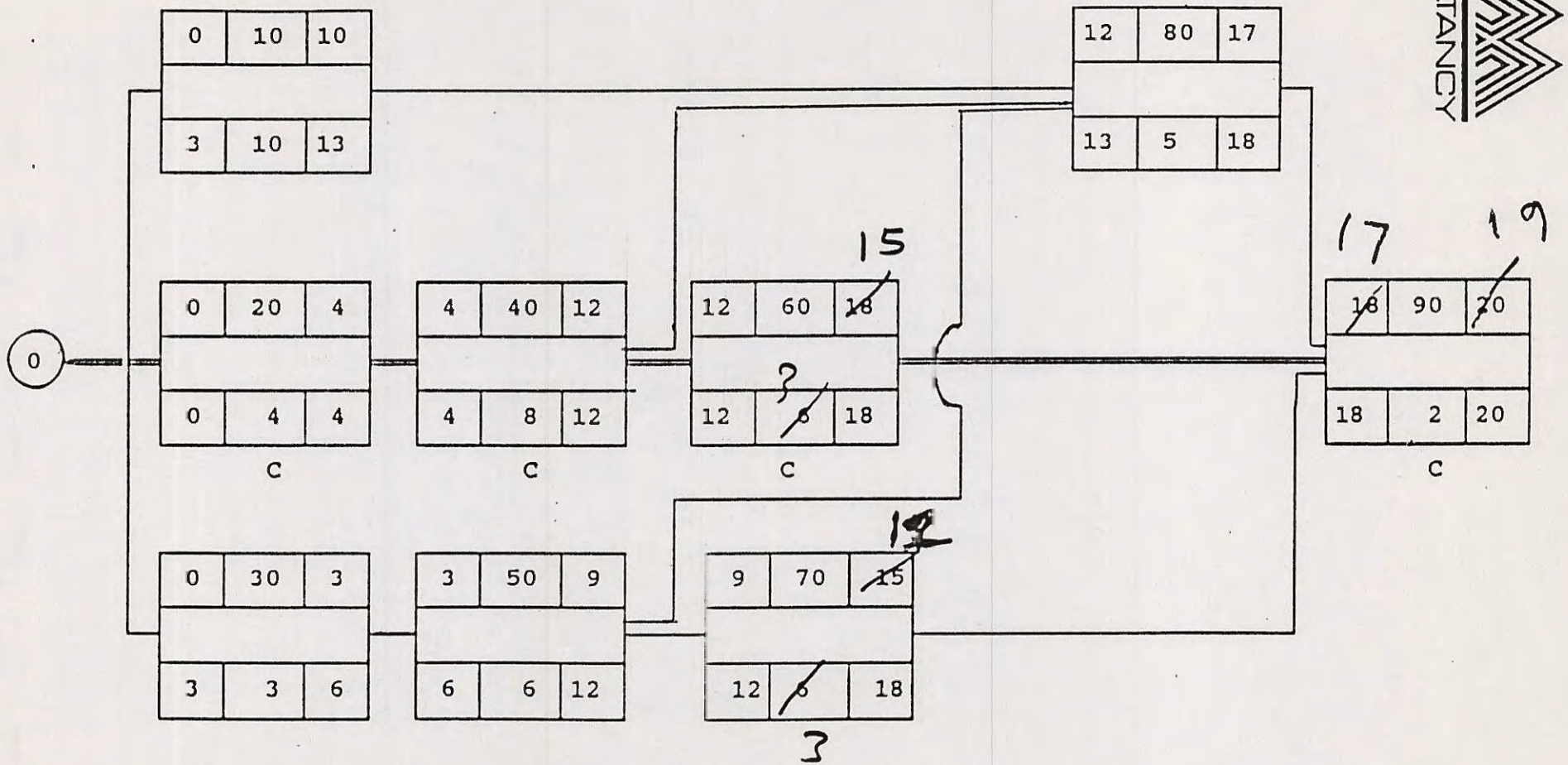
CASE (II)

TWO SETS OF FORM WORK

ACT. NO.	DESC.	DUR. WKS.	PREC. ACT.
10		10	--
20		4	--
30		3	--
40		8	20
50		6	30
60		6	40
70		6	50
80		5	40,50&10
90		2	~~80~~

60, 70 & 80

CASE II



Critical Path

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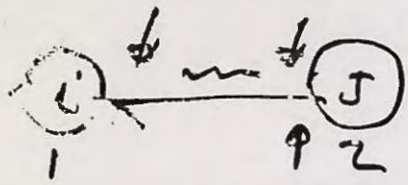
Draw networks (activity on the precedence) to keep the construction time minimum <u>assuming</u>

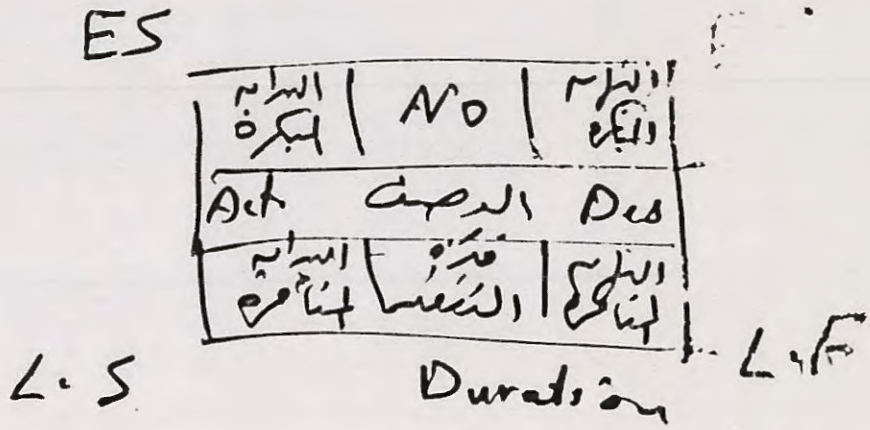
i) Excavation on both abutment may occur simultaneously.

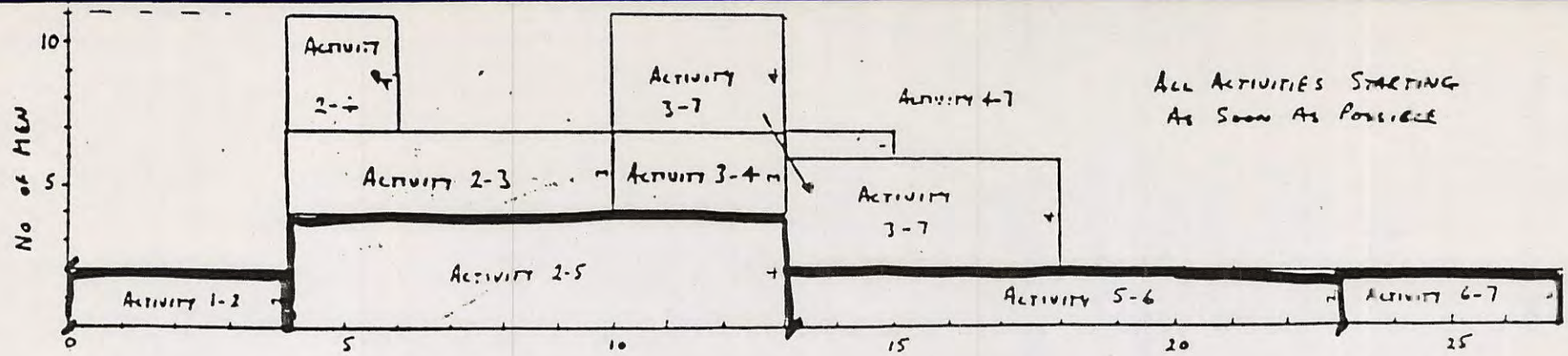
ii) Grading on N and S approaches may occur simultaneously but can not start until the respective abutment is complete.

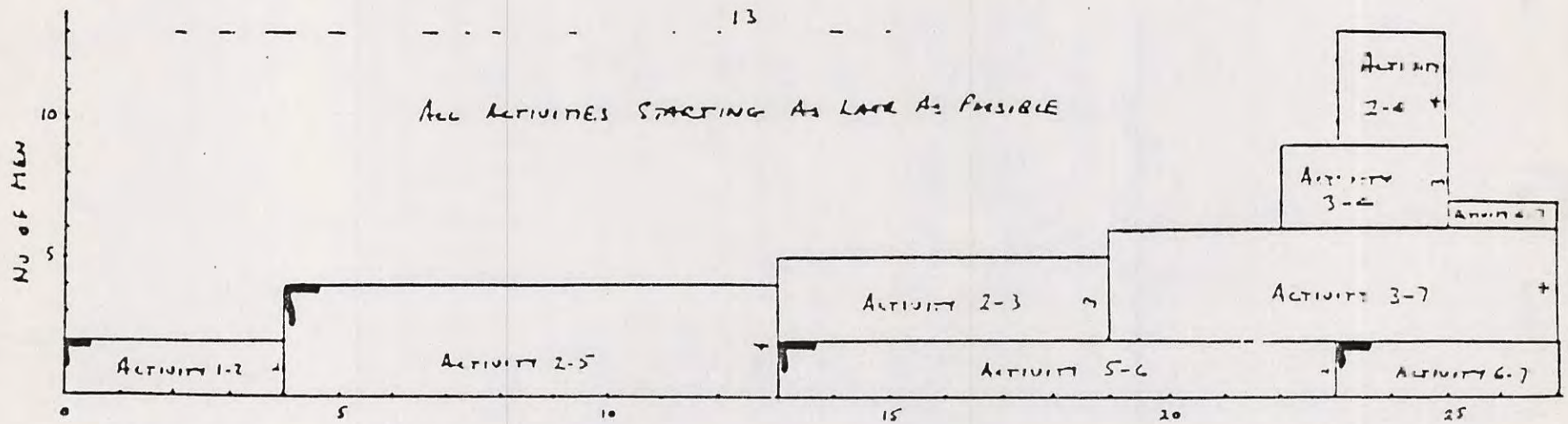
iii) Construction of the N and S abutments can not occur simultaneously as the same form work is to be used for both abutments.

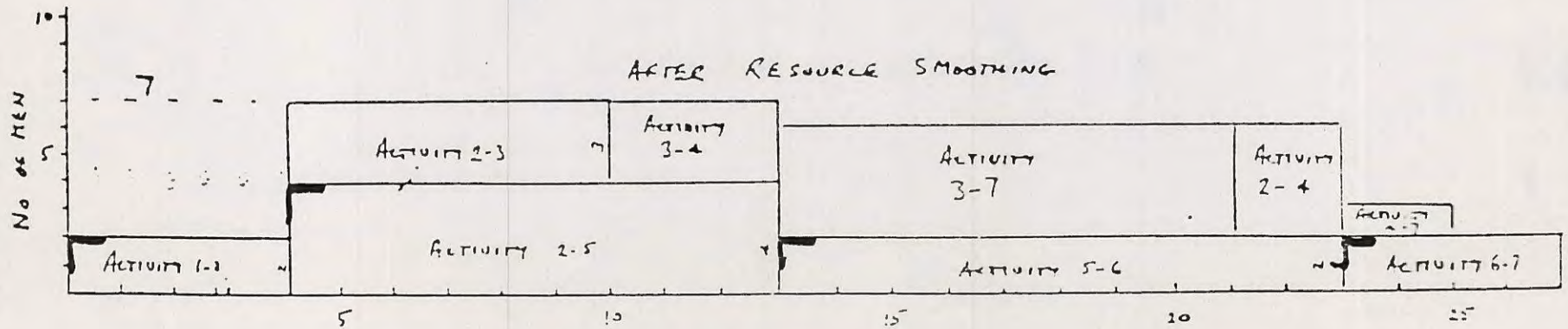
* Find the critical Path and the minimum construction period.
* How much time could be saved by using an extra set of form work?
* would having the time on the approaches by doubling the plant be as effective?











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