

Case 47

Bigstate Highway Department

Bigstate's highway department must select projects to be built during the coming year. Eleven projects have passed the preliminary screening (see Table 47-1). Five projects have mutually exclusive alternatives (for example A1, A2, and A3 are mutually exclusive alternatives for Project A). Each project and its alternatives must be evaluated at a 10% discount rate. The best set must be selected within a budget constraint of \$36 million for the first year's construction cost. For this analysis all projects and alternatives can be assumed to have a life of 20 years.

Political considerations require that at most one project of A and C be selected. Similar considerations require that at least three projects be selected from projects A, B, D, F, H, and J.

One of the biggest problems you have is that the Commissioner has identified the value for saving a human life with a range of \$100,000 to \$500,000, rather than a single value. Similarly, the department has determined that preventing a serious injury has a value between one-quarter and two-thirds of the value of a saved life.¹

What projects do you recommend?

¹ Liability lawsuits often result in higher awards for serious permanent disabilities than for deaths. The basis is not the "value" of the injury, but the cost of care and compensatory damages.

Table 47-1 Bigstate's Possible Highway Projects

	First		Annual Benefits		
	Cost	Annual Operating	Time and Distance		
	(\$M)	Cost (\$1000s)	(\$1000s)	Lives	Injuries
A1	8.0	350	950	2	11
A2	10.5	550	1300	2	11
A3	14.2	950	1350	2	11
B1	12.0	400	500	4	8
B2	14.5	500	1600	6	9
C	4.3	150	1100	0	0
D1	7.5	500	1950	1	8
D2	11.0	800	1950	4	10
E	9.4	0	700	3	5
F1	6.6	100	1100	0	6
F2	9.3	150	1500	0	8
G	7.5	200	1150	0	0
H	5.6	300	1500	1	0
I	7.9	1500	2800	1	1
J1	8.3	275	950	0	3
J2	11.4	475	950	2	3
K	16.0	850	2500	1	8

Option

How do your recommendations change over the range of possibilities for the values of lives and injuries? This can be presented graphically or in statements similar to the following:

"For values of human life between \$175,000 and \$238,000, do projects A3, D1. . . ."