Example Problem 3.1
Primary Clarifier

A primary clarifier is to be designed to treat an industrial wastewater having 320 mg/ℓ suspended solids and a flow of 2.0 MGD. A batch settling test was performed using an 8-in.-diameter column that was 10 ft long and had withdrawal ports every 2.0 ft. The reduced data giving the percent removals are as shown in Table 3.1.

Table 3.1. Percent Suspended Solids Removal at Given Depths

Time (min)	2 ft	4 ft	6 ft	8 ft	10 ft
0	0	0	0	0	0
10	28	18	18	12	[a]
20	48	39	25	27	[a]
30	68	50	34	31	[a]
45	70	56	53	41	[a]
60	85	66	59	53	[a]
90	88	82	73	62	[a]

a. Data showed an increase in solids concentration

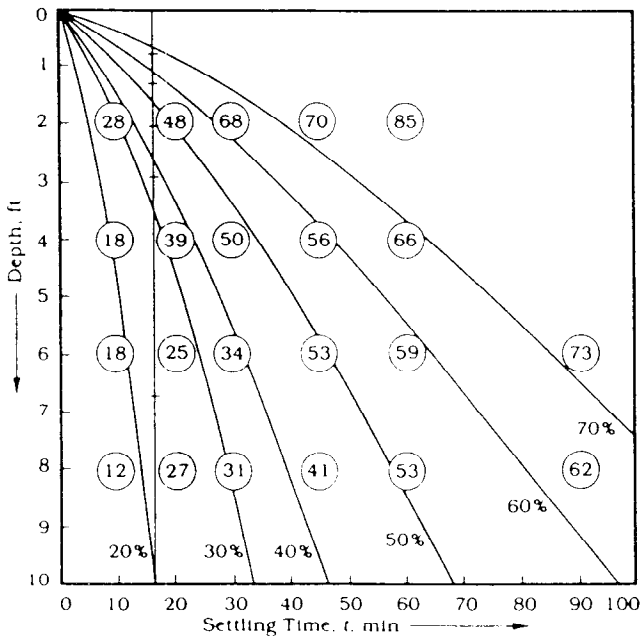
Determine:

1. The design detention time and design overflow rate if 65 percent of the suspended solids are to be removed.
2. The design diameter and depth.

Solution

A plot of the percent removals at the various depths and times is shown in Figure 3.11. Interpolations have been

Figure 3.11. Graph Showing Suspended Solids Removal (as a Percent) at Various Depths and Settling Times, for Example Problem 3.1.



SET - 1