Chapter IV

RESULTS OF EXPERIMENTS

4.1 Raw Water Quality

The raw water quality remained reasonably constant, as shown in Table 4.1

TABLE 4.1 Data of Raw Water

Date	turbidity JTU	alkalinity mg/l	pH
Oct. 1, 1971	32	52	7.2
2	27	50	7.21
3	30	52	7.22
4	28	55	7.4
5	30	54	7.25
6	40	56	7.3
7	35	52	7.18
8	35	54	7.12
9	30	52	7.2
10	25	53	7.2
11	27	48	7.12
12	25	54	7.10
13	25	47	7.12

Date	turbidity JTU	alkalinity mg/l	pH
14	23	48	7.18
15	30	48	7.15
16	34	45	7.12
17	35	50	7.15
18	35	52	7.1
19	30	56	7.12
20	29	55	7.12
21	25	50	7.15
22	32	54	7.18
23	27	56	7.16
24	28	54	7.15
25	30	55	7.15
26	35	58	7.10
27	33	52	7.20
28	30	55	7.1
29	34	60	7.12
30	35	50	7.12
31	30	50	7.1
Nov. 1, 1971	36	46	7.15
2	32	48	7.10
3	30	48	7.1
4	38	46	7.1

Date	turbidity JTU	alkalinity mg/l	pH
5	35	54	7.2
6	38	52	7.18
7	35	56	7.18
8	40	62	7.18
9	40	52	7.2
10	39	60	7.12
11	35	60	7.12
12	34	45	7.15
13	34	50	7.10
14	32	50	7.10
15	37	62	7.10
16	32	60	7.10
17	35	52	7.10
18	40	56	7.25
19	38	74	7.35
20	27	68	7.4
21	28	70	7.3
22	30	68	7.25
23	28	66	7.2
24	32	58	7.2
25	38	66	7.2
26	32	62	7.12

Date	turbidity JTU	alkalinity mg/l	pH
27	28	66	7.15
28	30	56	7.2
29	28	56	7.25
30	28	55	7.25
Dec. 1, 1971	26	60	7.24
2	30	64	7.28
3	34	52	7.25
4	30	50	7.25
5	28	55	7.25
6	30	60	7.20
7	22	65	7.20
8	26	60	7.18
9	25	65	7.20
10	22	65	7.20
11	25	60	7.18
12	27	65	7.20
13	25	70	7.21
14	27	65	7.20
15	30	70	7.21
16	25	70	7.20
17	27	70	7.22
18	25	65	7.20

Date	turbidity JTU	alkalinity mg/l	pH
19	25	66	7.20
20	28	70	7.25
21	27	65	7.28
22	27	65	7.25
23	30	70	7.21
24	30	71	7.22
25	28	69	7.25
26	27	67	7.25
27	35	72	7.30
28	32	75	7.30
29	35	68	7.25
30	32	70	7.20
31	35	75	7.20
Jan. 1, 1972	31	74	7.28
2	32	72	7.25
3	32	70	7.25
4	30	74	7.28
5	34	72	7.28
6	37	76	7.20
7	40	90	7.30
8	38	76	7.30
9	31	72	7.28
10	36	80	7.20

4.2 Effect of Sludge Concentration on Effluent Turbidity at Various Upflow Velocities

First, the upflow velocity and speed turbine were kept constant, the sludge concentration was varied between 2% and 50% by increasing or decreasing the time intervals between the extractions. The effluent turbidity of every run was measured by HACH turbidimeter model 2100.

Then changed the speed of turbine as the upflow velocity was kept constant. The sludge concentration was varied in the same manner as before, and the effluent turbidity was measured. Finally, the upflow velocity was varied from 1.125 to 1.730 gal/min/ft^2. The results are shown in Fig. 4.1, 4.2 and 4.3.

4.3 Effect of Sludge Blanket Depth on Effluent Turbidity

The experiments were carried out to determine the effect of sludge blanket depth on effluent turbidity in steps as follows:

a. Vary the depth of the sludge blanket and measure the changes in effluent turbidity while the upflow velocity and the speed of turbine were kept constant.

Sludge blanket depth in the experiment was varied between 1.00 meter to 2.25 meters below the surface water. The depths of sludge blanket were measured by a ballasted bottle of 1000 ml capacity which was immersed into the accelator until it disappeared then marked on the rope and measured the length. Sludge blanket depth can be controlled by varying the rate of sludge extraction. The results of effluent turbidity were measured.

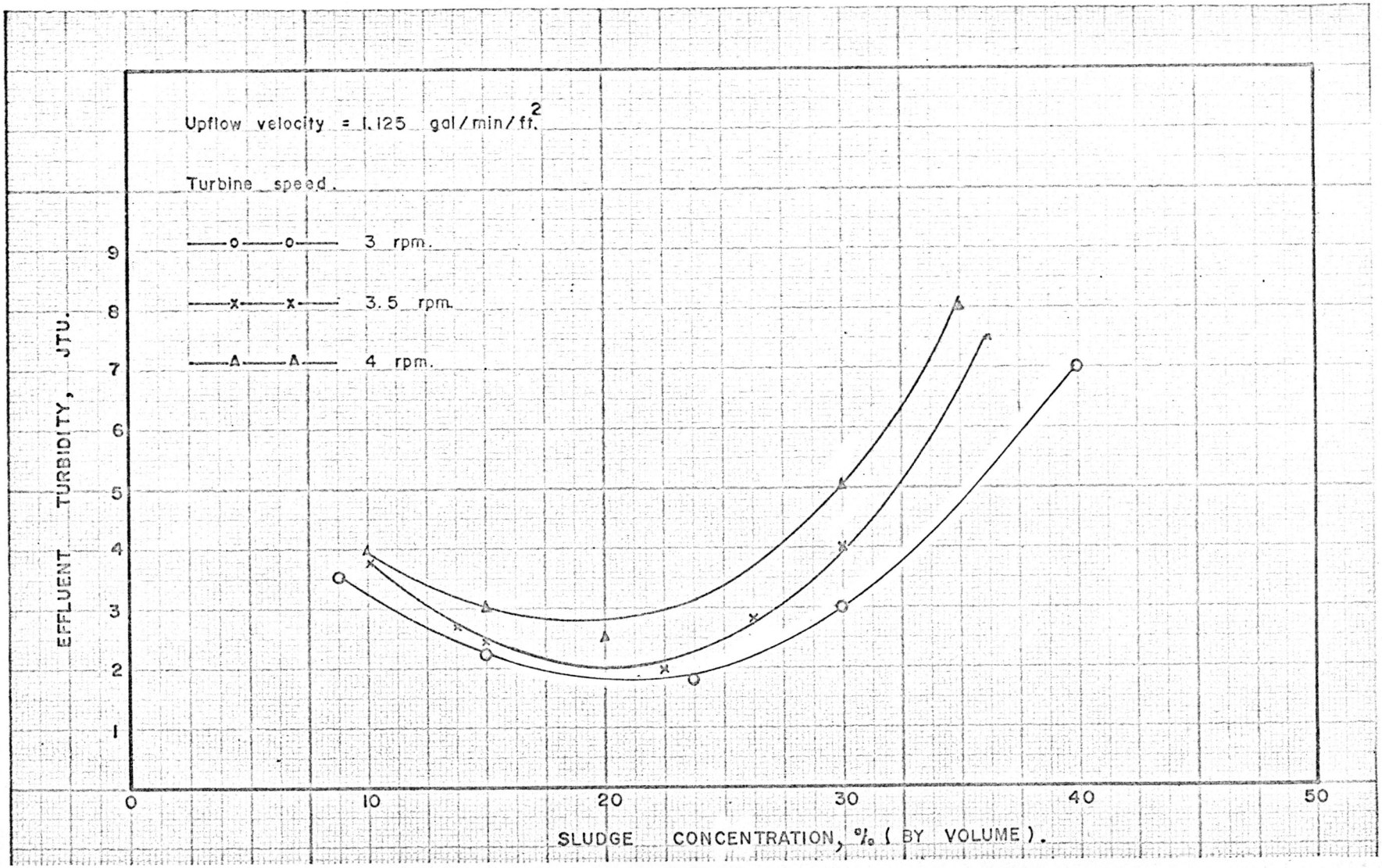

Fig. 4.1 Effect of Sludge Concentration on Effluent Turbidity at Various Upflow Velocities

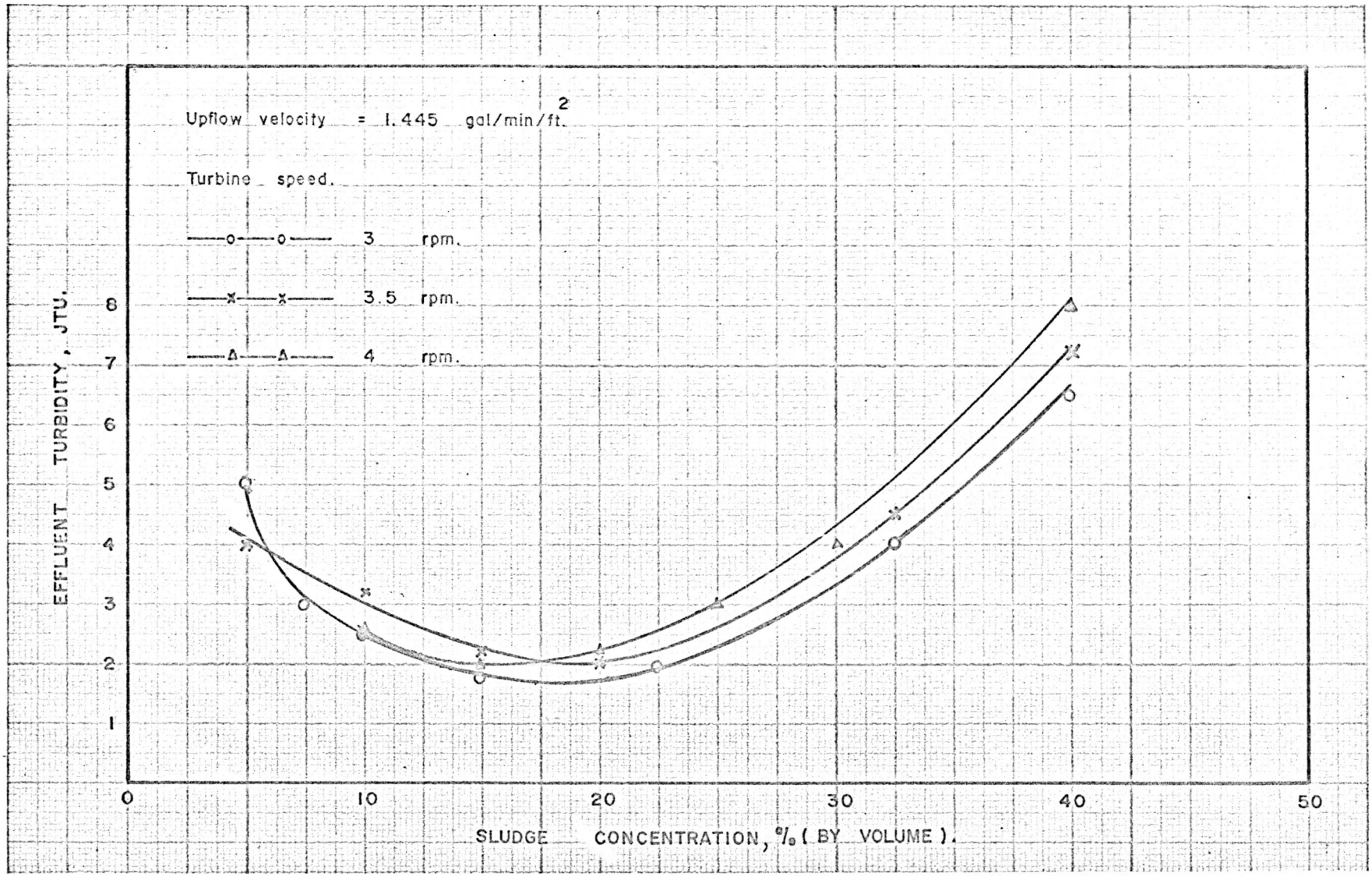

Fig. 4.2 Effect of Sludge Concentration on Effluent Turbidity at Various Upflow Velocities

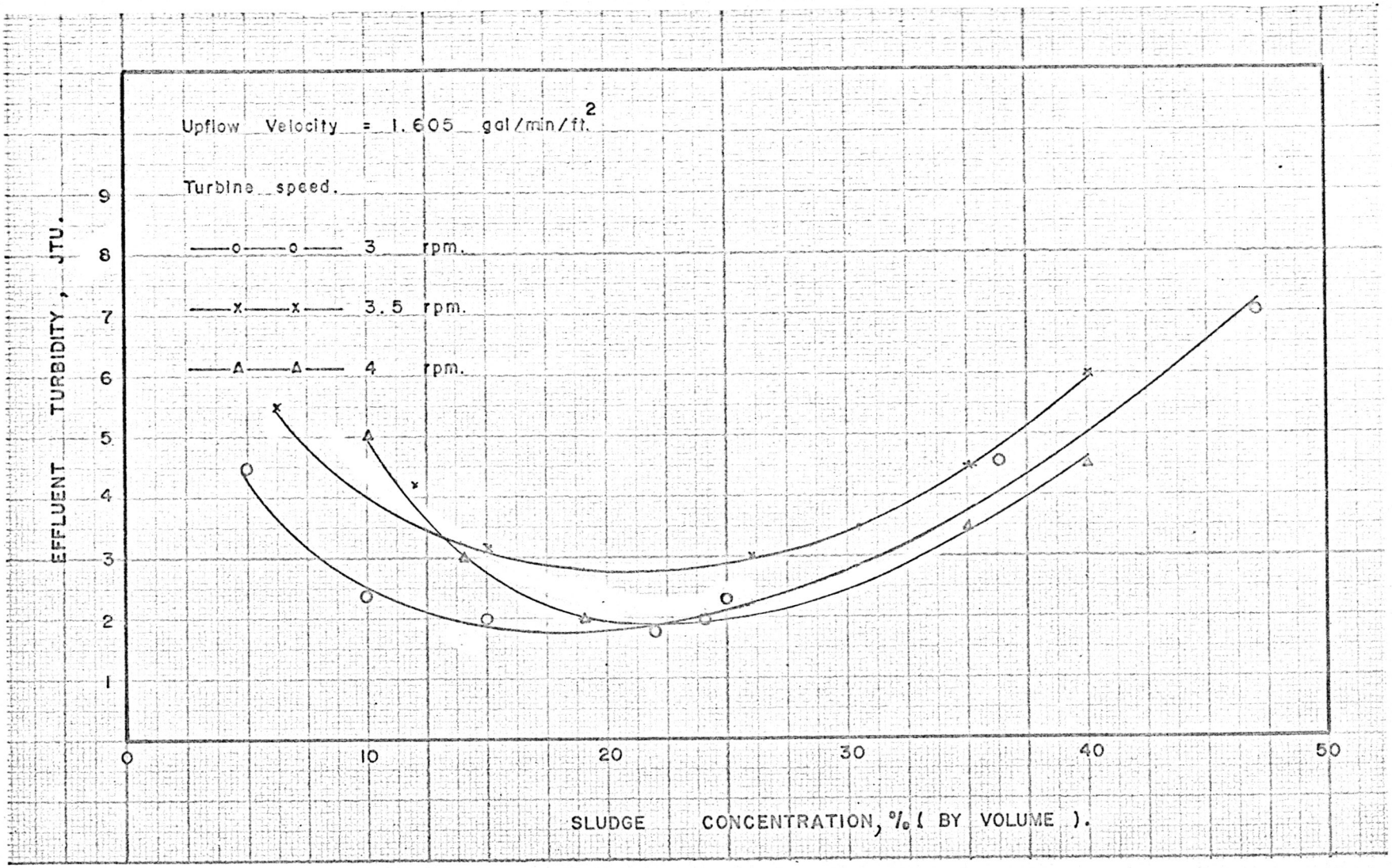

Fig. 4.3 Effect of Sludge Concentration on Effluent Turbidity at Various Upflow Velocities.

b. Repeated step a. with different turbine speeds. The speed was varied from 3 to 3.5 and 4 rpm. respectively.

c. Repeated step a. and b. with different upflow velocity which started from 1.125 gal/min/ft^2 to 1.285, 1.445, 1.605 and 1.730 gal/min/ft^2 respectively.

The results are shown in Fig. 4.4, 4.5, 4.6 and 4.7.

4.4 Effect of Speed of Turbine on Effluent Turbidity

The graphs showing the effect of speed of turbine on effluent turbidity are shown in Fig. 4.8 and 4.9. The experiments were carried out in step as follows:

a. By varying speed of turbine, sludge blanket depth and upflow velocity were kept constant. The speed of turbine was varied from 2 rpm to 3, 3.5, 4, 4.5 and 5 rpm respectively. The maximum speed of turbine is 6 rpm, but this speed was not used for fear of mechanical failure.

b. After having changed the speed for 2 hours, the effluent turbidity was measured.

Throughout these experiments the sludge blanket depth was kept constant.

4.5 Effect of Upflow Velocity on Effluent Turbidity

Keeping the speed of turbine and sludge blanket depth constant, the upflow velocity was varied from 1.125 to 1.750 gal/min/ft^2. Increasing rate of raw water flow to clarifier will increasing upflow velocity. As raw water from Bangsue pumping station and Bangkok Noi pumping

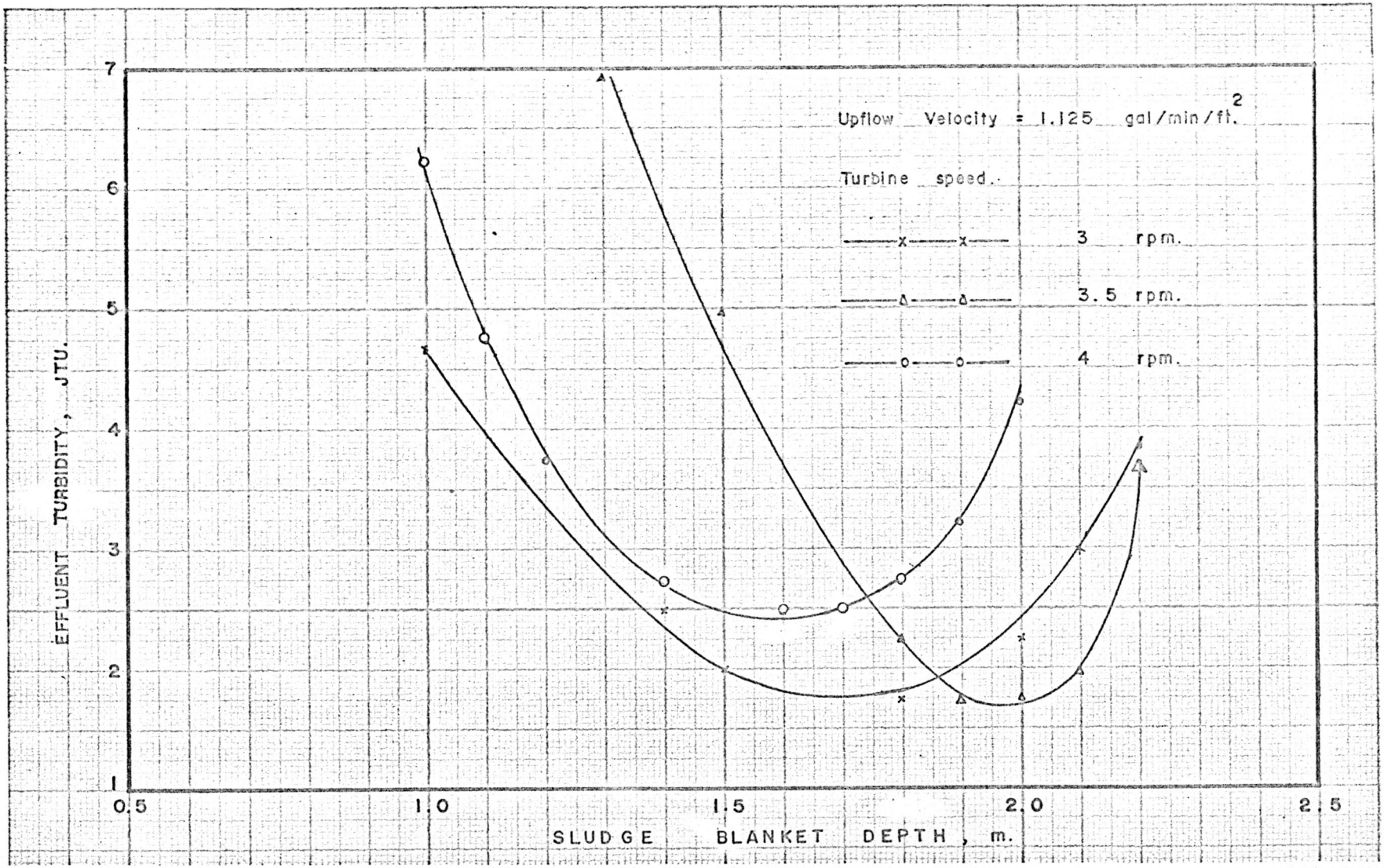

Fig. 4.4 Effect of Sludge Blanket Depth on Effluent Turbidity.

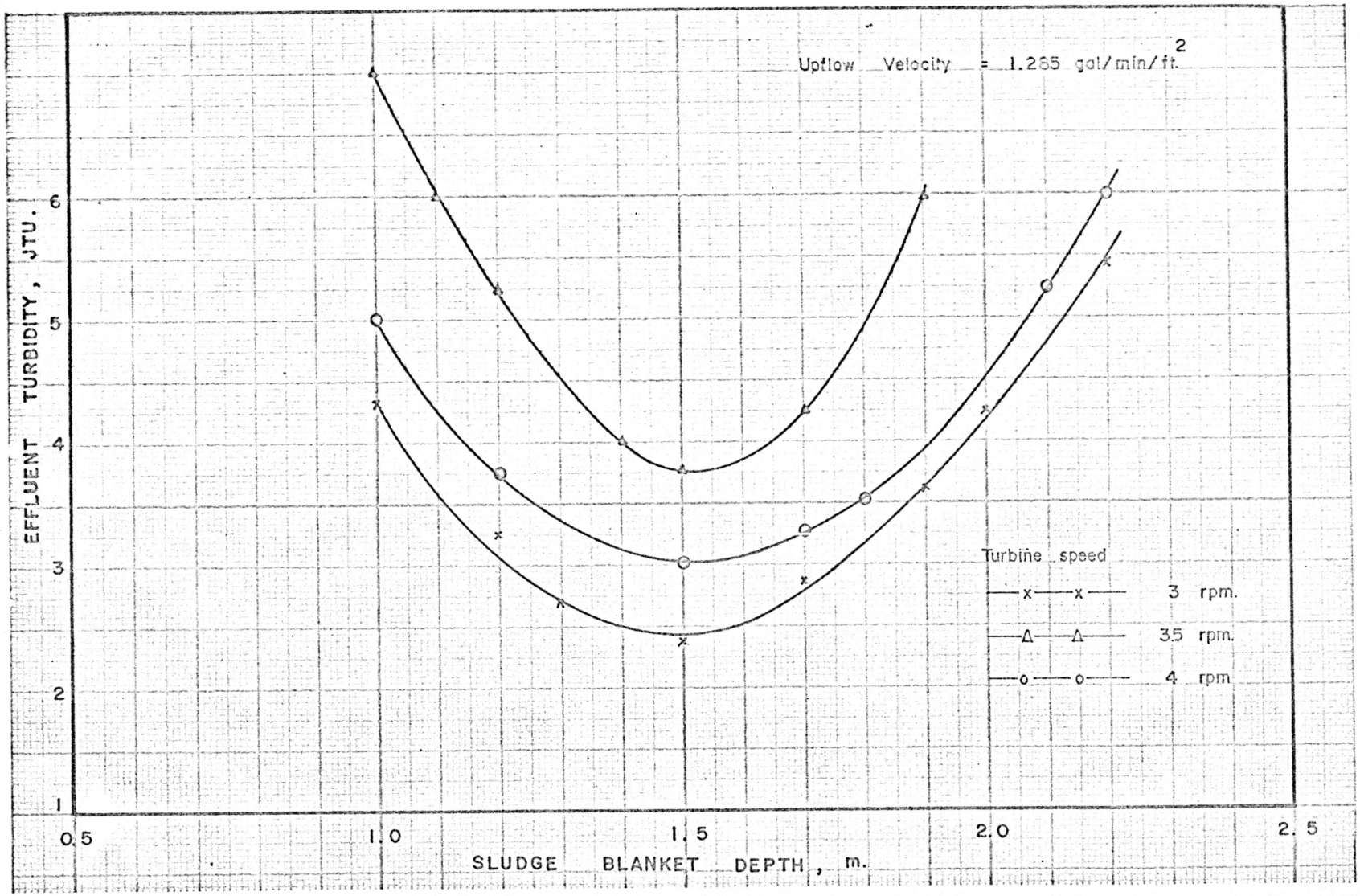

Fig 4.5 Effect of Sludge Blanket Depth on Effluent Turbidity

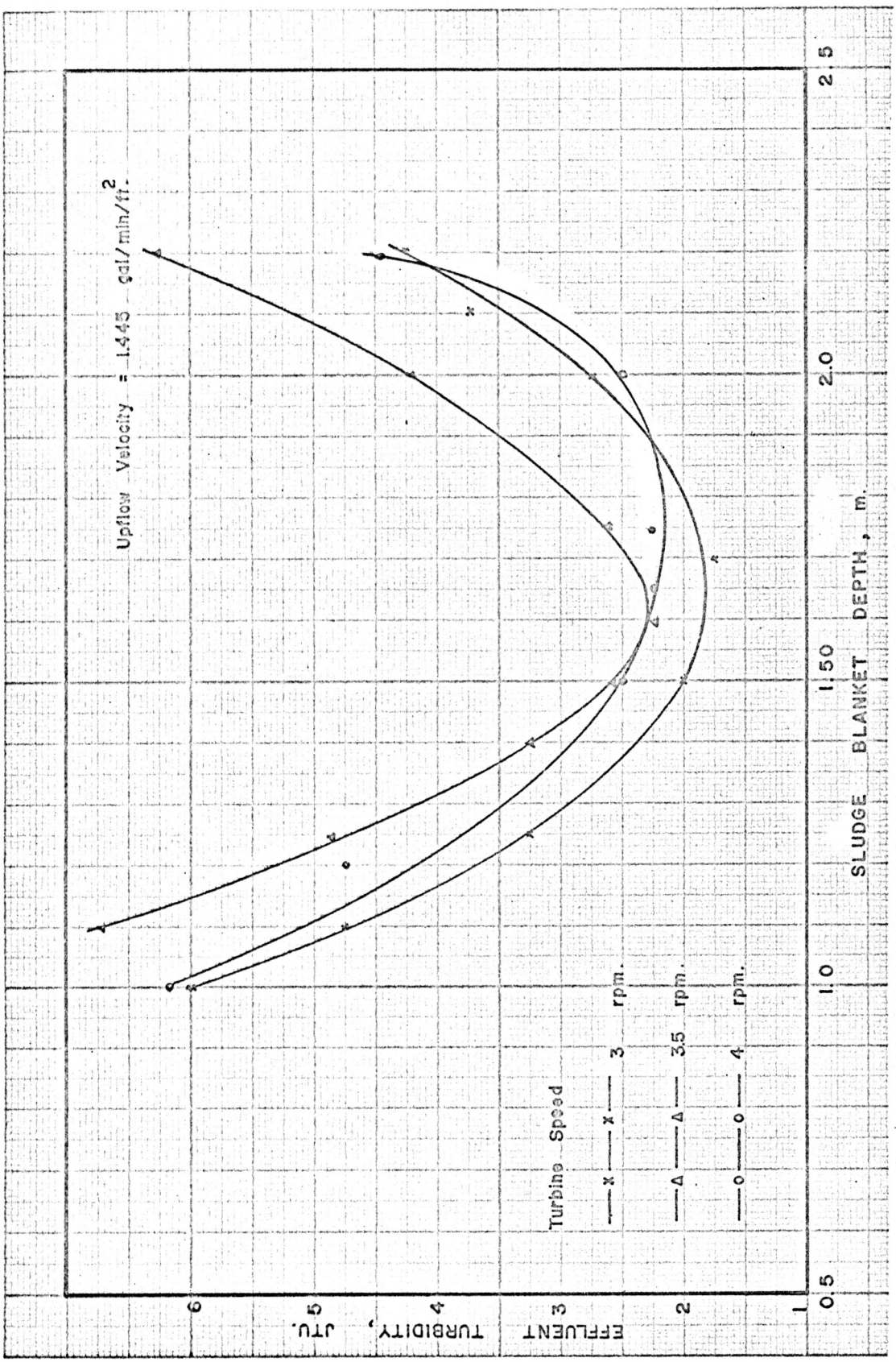

Fig. 4.6 Effect of Sludge Blanket Depth on Effluent Turbidity

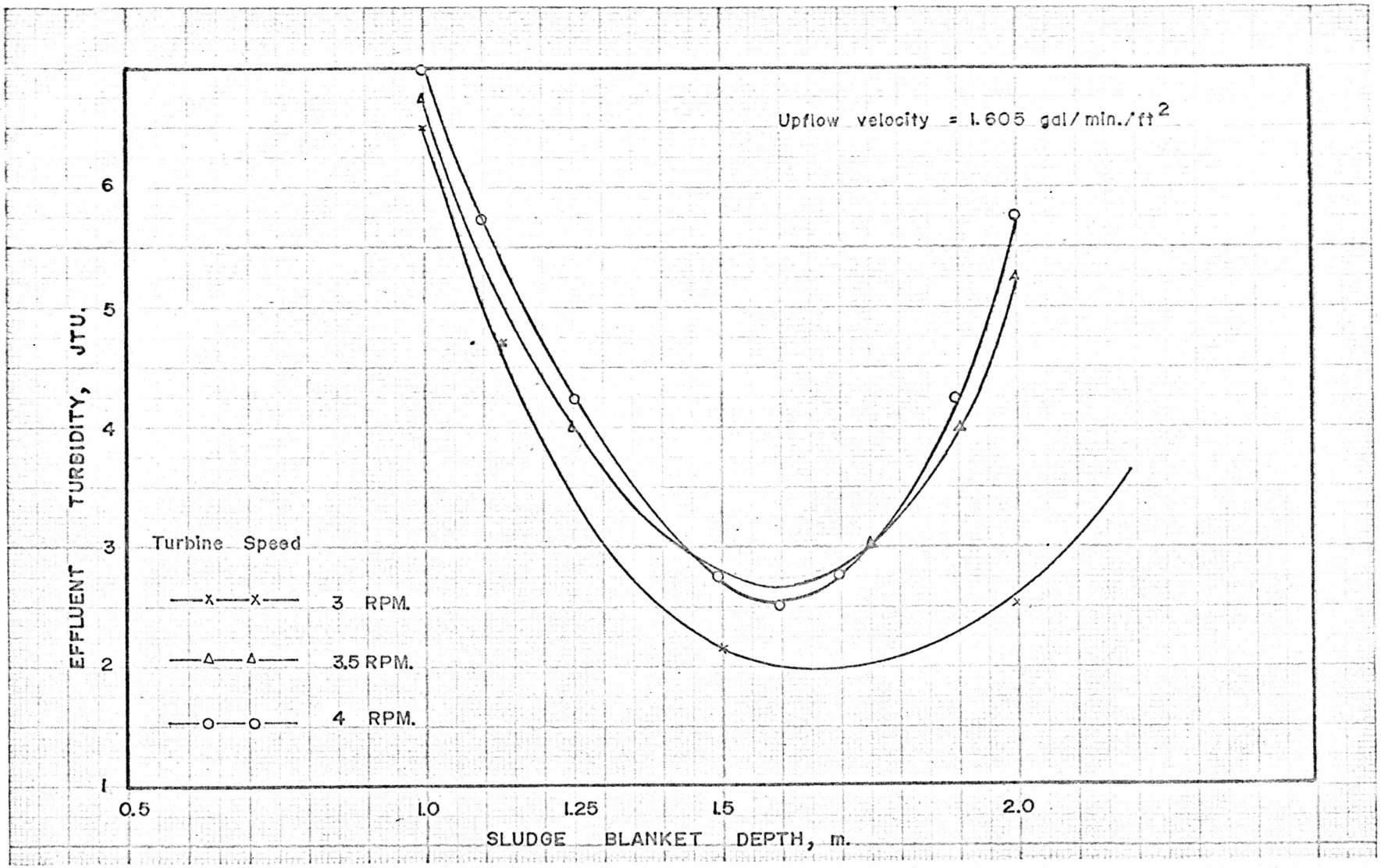

Fig. 4.7 Effect of Sludge Blanket Depth on Effluent Turbidity

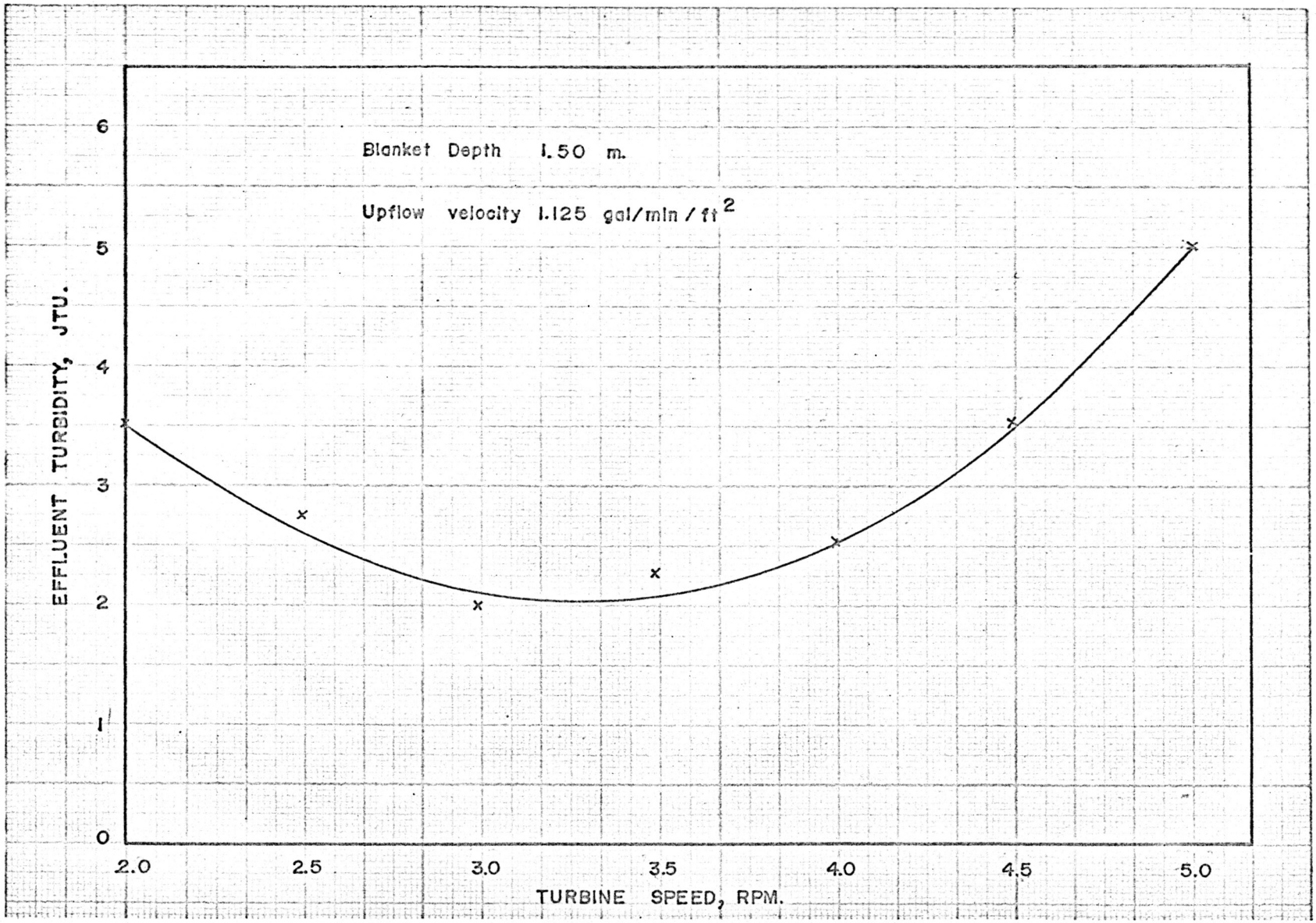

Fig. 4.8 Effect of Turbine Speed on Effluent Turbidity

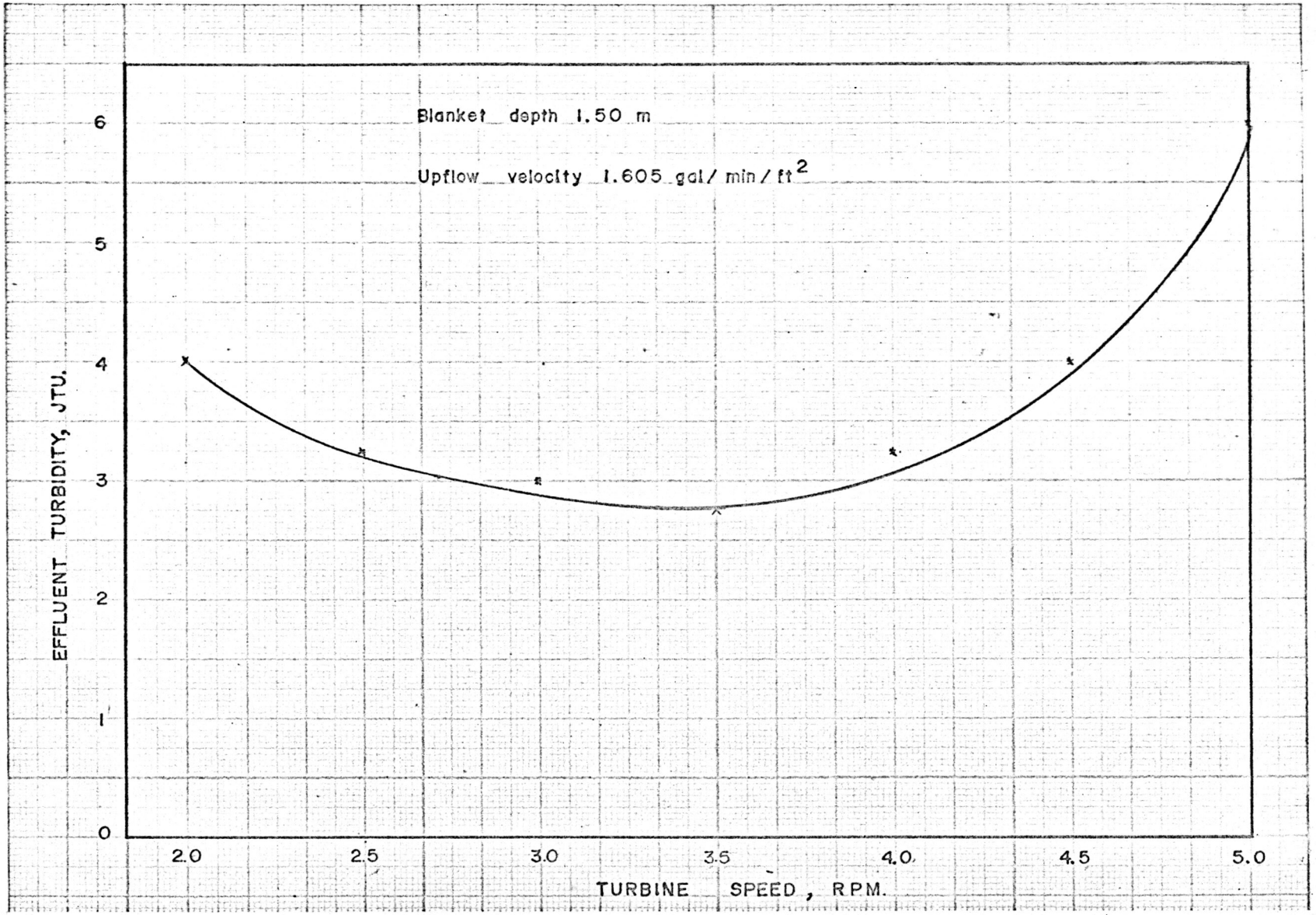

Fig. 4.9 Effect of Turbine Speed on Effluent Turbidity

station could supply Thonburi water treatment plant with a loading capacity up to 1.125 gal/min/ft^2 for each accelator clarifier, the loading capacity could be increased from 1.125 to 1.750 gal/min/ft^2 by inserting weirs in other channel on the inlet tower and letting the raw water flow to the channel that led to the accelator clarifier number 2. The rate of flow was controlled by pitometer and recorded by simplex pitot recorder. The results are shown in Fig. 4.10 and 4.11.

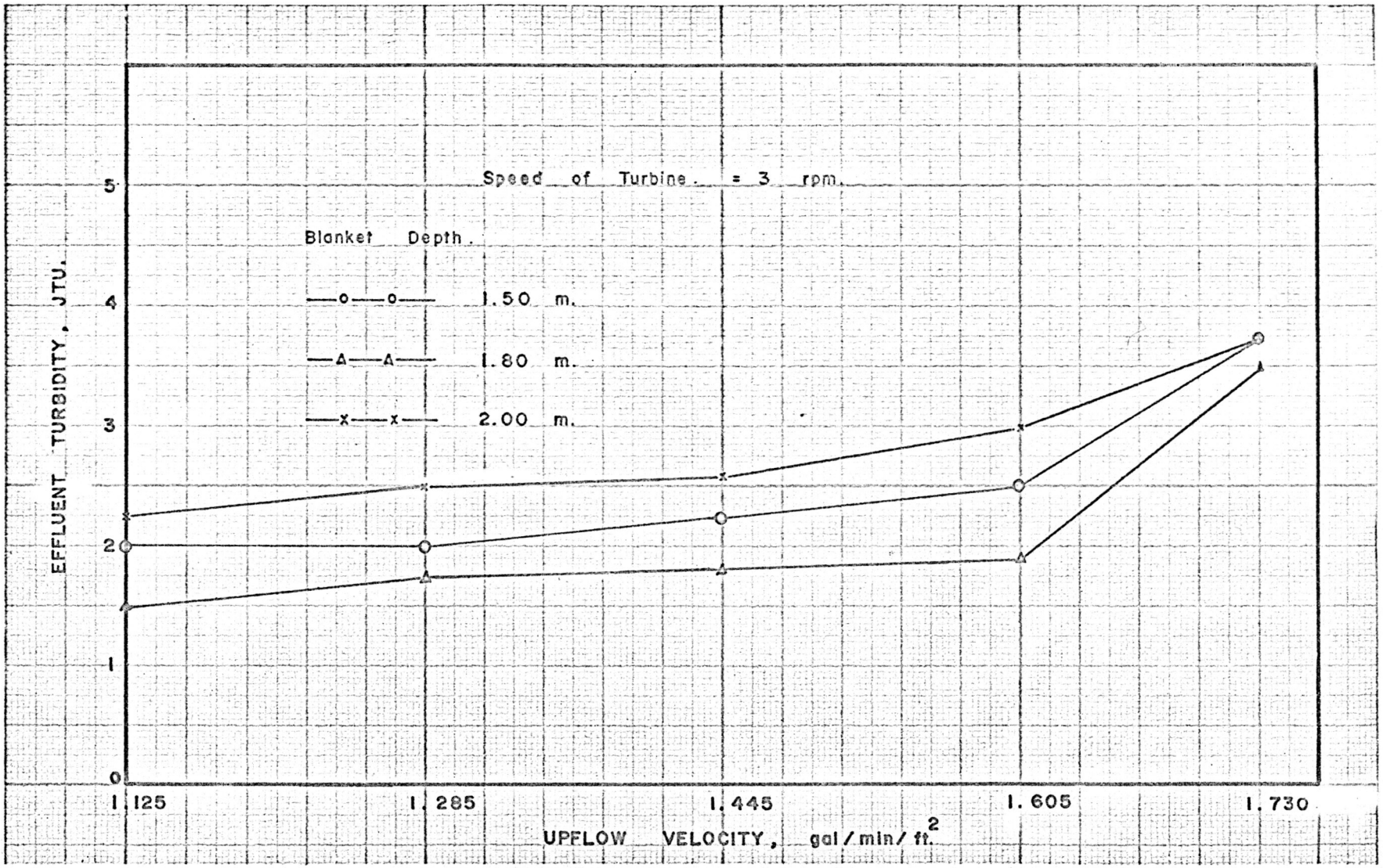

Fig. 4.10 Effect of Upflow Velocity on Effluent Turbidity

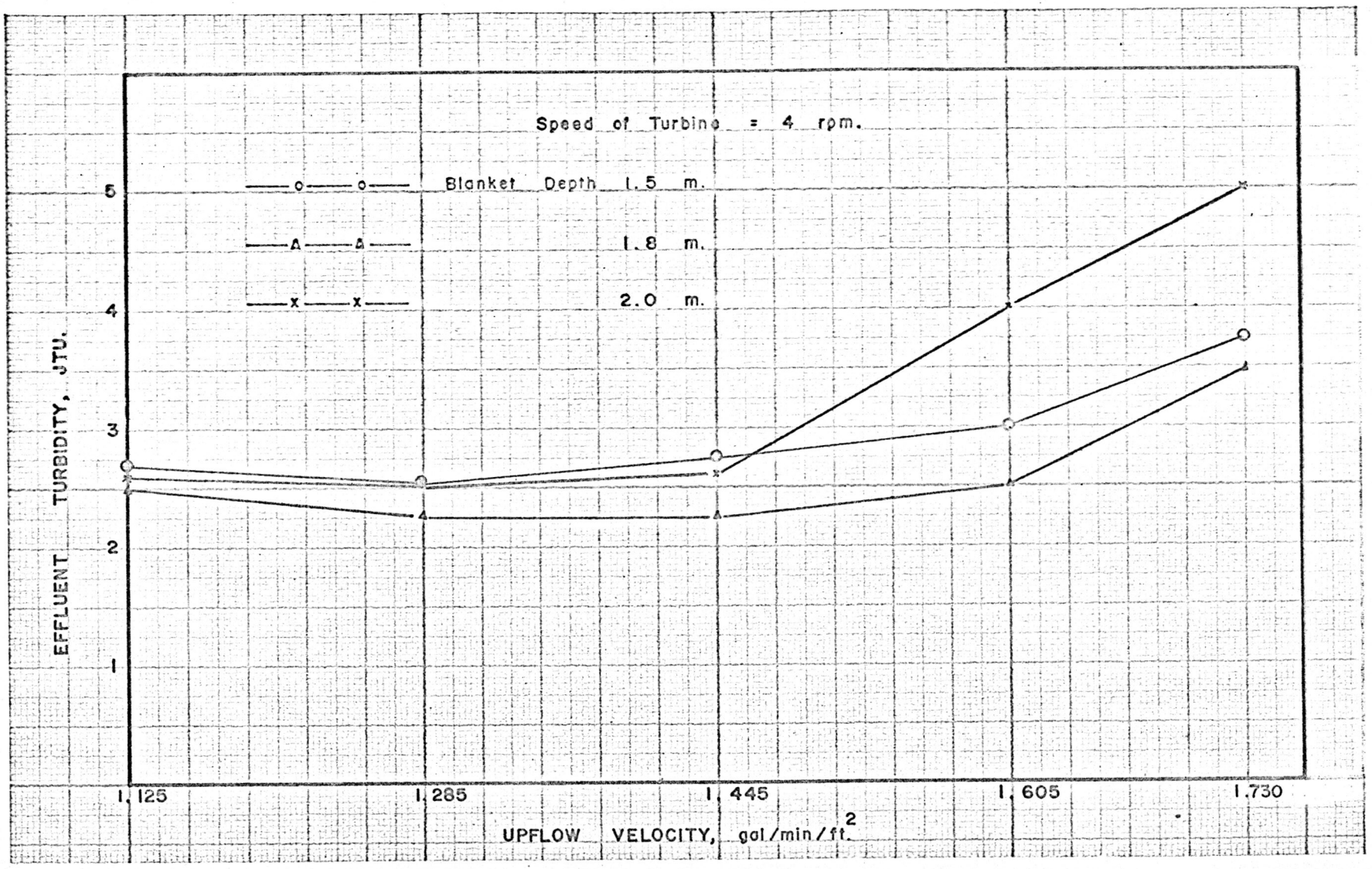

Fig 4.11 Effect of Upflow Velocity on Effluent Turbidity