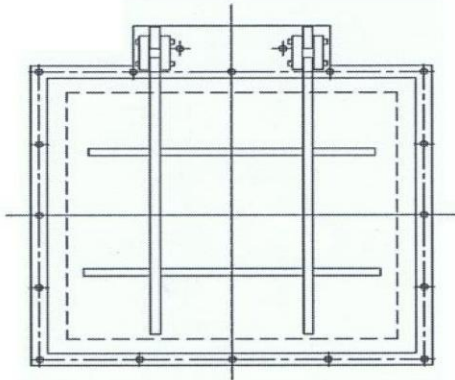
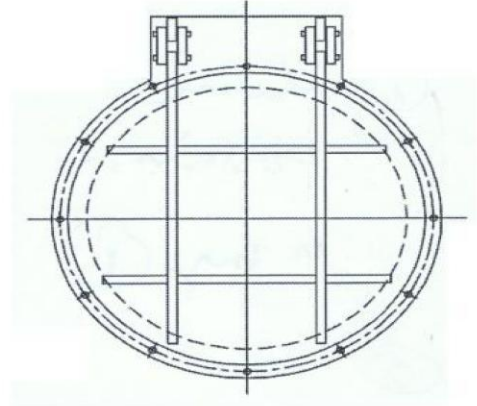


Features

- . No Protective Coatings And Lubrication To Apply
- . Lightweight
- . No Rotting
- . No Material Fatigue
- . Easy Installation And Minimum Maintenance
- . Flexibility On Dimension
- . Low Opening Pressure Head
- . Robust Structure



Applications

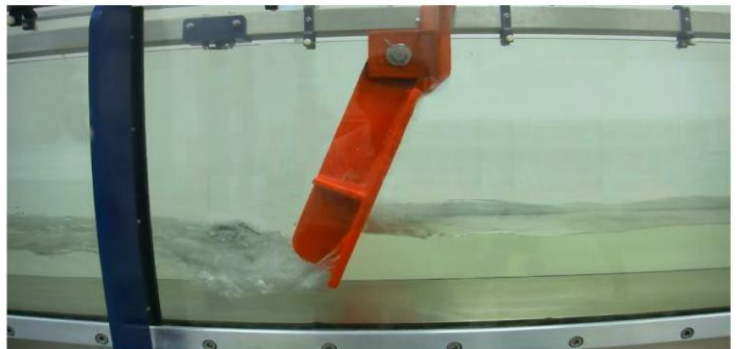
- . Tidal And Flood Control Of River And Sea Side
- . To Prevent Backflow Of Water
- . Prevent Intrusion Of Saltwater during High Tides
- . Irrigation And Agricultural Schemes To Increase Yield
- . Suitable For Use In Pipeline, Sewage, Water and Waste Water Applications

Methodology

Hydraulic tests to determine the free flow force required to open the gate have been conducted in the Water Resources Engineering Laboratory, Universiti Tun Hussein Onn Malaysia.



The flap gate was installed at a distance of approximately 2.5 m, 5 m, and 7.5 m away from the upstream of the open channel. For each installation distance, the open channel was tilted at slopes of 0° , 0.0033° , 0.005° , and 0.01° .



In each case, the force required to open the flap gate were computed for 6 various flow rates, i.e. 0.005 m³/s, 0.007 m³/s, 0.009 m³/s, 0.012 m³/s, 0.015 m³/s, and 0.035 m³/s.

Resultant force required to open the gate when gate is installed approximately 5.0 m away from upstream of open channel

Channel slope S_c	Flow rate Q (m^3/s)	Upstream water depth y_c (m)	Angle of gate at close position		Recipient opening of the gate YES / NO	Opening gate time t (sec)	Vertical distance from fluid to the centroid of the area h_c (m)	Water depth from surface to the submerged plane center y_c (m)	Submerged plane area A (m^2)	Second moment area I_c (m^4)	Location of resultant force y_R (m)	Resultant force F_R (N)
			Remaining unclosed horizontal distance x (m)	Angle θ ($^\circ$)								
Flat	0.005	0.120	0.105	19.59	YES	82.50	0.0600	0.0600	0.0354	4.2480×10^{-3}	0.0800	20.8364
	0.007	0.102	0.092	17.32	YES	51.31	0.0510	0.0510	0.0301	2.6088×10^{-3}	0.0680	15.0543
	0.009	0.065	0.069	13.16	YES	18.09	0.0325	0.0325	0.0192	6.7512×10^{-3}	0.0433	6.1135
	0.012	0.080	0.107	19.94	YES	20.37	0.0400	0.0400	0.0236	1.2587×10^{-3}	0.0533	9.2606
	0.015	0.105	0.088	16.61	YES	14.19	0.0525	0.0525	0.0310	2.8458×10^{-3}	0.0700	15.9529
	0.035	0.080	0.115	21.30	YES	1.81	0.0400	0.0400	0.0236	1.2587×10^{-3}	0.0533	9.2606
1/300	0.005	0.100	0.087	16.43	YES	53.22	0.0500	0.0500	0.0295	2.4583×10^{-3}	0.0667	14.4698
	0.007	0.095	0.083	15.71	YES	34.44	0.0475	0.0475	0.0280	2.1077×10^{-3}	0.0633	13.0589
	0.009	0.080	0.073	13.90	YES	20.78	0.0400	0.0400	0.0236	1.2587×10^{-3}	0.0533	9.2606
	0.012	0.105	0.111	20.62	YES	19.06	0.0625	0.0625	0.0310	2.8458×10^{-3}	0.0700	15.9529
	0.015	0.105	0.023	4.46	YES	15.47	0.0525	0.0525	0.0310	2.8458×10^{-3}	0.0700	15.9529
	0.035	0.100	0.073	13.90	YES	1.65	0.0500	0.0500	0.0295	2.4583×10^{-3}	0.0667	14.4698
1/200	0.005	0.120	0.107	19.94	YES	83.28	0.0600	0.0600	0.0354	4.2480×10^{-3}	0.0800	20.8364
	0.007	0.120	0.103	19.25	YES	44.12	0.0600	0.0600	0.0354	4.2480×10^{-3}	0.0800	20.8364
	0.009	0.090	0.105	19.59	YES	20.63	0.0450	0.0450	0.0266	1.7921×10^{-3}	0.0600	11.7205
	0.012	0.105	0.124	22.80	YES	19.15	0.0525	0.0525	0.0310	2.8458×10^{-3}	0.0700	15.9529
	0.015	0.125	0.076	14.45	YES	18.16	0.0625	0.0625	0.0369	4.8014×10^{-3}	0.0833	22.6090
	0.035	0.095	0.111	20.62	YES	1.63	0.0475	0.0475	0.0280	2.1077×10^{-3}	0.0633	13.0589
1/100	0.005	0.110	0.087	16.43	YES	53.94	0.0550	0.0550	0.0325	3.2720×10^{-3}	0.0733	17.5084
	0.007	0.105	0.086	16.25	YES	29.32	0.0525	0.0525	0.0310	2.8458×10^{-3}	0.0700	15.9529
	0.009	0.110	0.123	22.63	YES	24.75	0.0550	0.0550	0.0325	3.2720×10^{-3}	0.0733	17.5084
	0.012	0.105	0.091	17.14	YES	12.32	0.0525	0.0525	0.0310	2.8458×10^{-3}	0.0700	15.9529
	0.015	0.100	0.113	20.96	YES	4.31	0.0500	0.0500	0.0295	2.4583×10^{-3}	0.0667	14.4698
	0.035	0.055	0.150	26.95	YES	1.16	0.0275	0.0275	0.0162	4.0900×10^{-4}	0.0367	4.3771

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