

Aquadam lateral force resistance calculation

12' dam with 12' backup

Single dam

Dam height, h	12 feet	3.7 Meters
height of retained water, d	8.2 feet	2.5 Meters
Temp of water in dam and being retained assumed similar	68 deg F	20 deg C
Density of water, g	62.3 lbs/cuft	998.0 Kg/cuMeter
flow rate normal to dam, v	0 feet/second	0.0 Meters/Second
Contact width across bottom of dam, w	19 feet	5.8 Meters
Coefficient of friction, m	0.14	0.14

Lateral force from flow = $dg v^2/2$	0 lbs/ft dam length	0.0 N/M dam length
Lateral force from static height = $gd^2/2$	2,095 lbs/ft dam length	470.9 N/M dam length
Total lateral force	2,095 lbs/ft dam length	470.9 N/M dam length
Total pressure acting on interior dam membrane contact width, = ghw	14,204 lbs/ft dam length	3193.3 N/M dam length
Flotation force from static height = $gdw/2$	4,853 lbs/ft dam length	1091.0 N/M dam length
Net gravitational force creating friction = ghw – $gdw/2$	9,351 lbs/ft dam length	2102.2 N/M dam length
Frictional force resisting lateral movement	1,309 lbs/ft dam length	294.3 N/M dam length
Factor of safety against lateral displacement	0.63	0.63

Lateral force resistance with second dam as back up

Second dam height, h	12 feet	3.7 Meters
Second dam contact width across bottom of dam, w	19 feet	5.8 Meters
Frictional force resisting lateral movement = ghwm	1989 lbs/ft dam length	447.1 N/M dam length
Combined frictional force resisting lateral force	3298 lbs/ft dam length	741.4 N/M dam length
Combined factor of safety	1.57	1.57