PAP 926

Test Results of Intralox Traveling Screen Material

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providing a flow of about 6.5 ft^3/s with a maximum depth of about 5 ft. There are straightening vanes on the curve entering the 10 degree converging section where the traveling screen was installed. The section converged to a width of 2 ft where the bypass flow was removed by a pipeline. Flow enters the facility in the channel opposite the screen and travels through the straightening vanes to the screen. Flow then travels past or through the screen and is measured with strap-on acoustic flow meters on each exit pipe. These flows then combine and are recirculated back into the channel upstream from the screen installation.

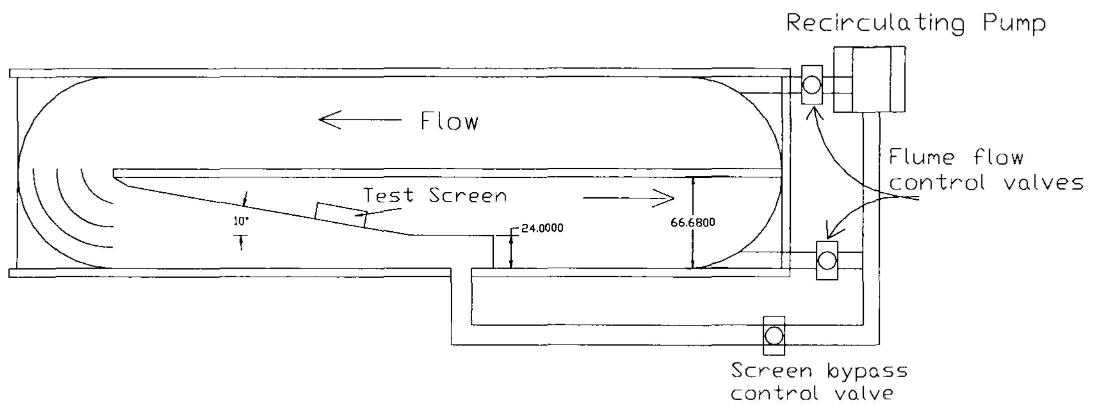


Figure 1. - Overall plan view of the recirculating flume facility schematically showing the location of the test screen and the piping.

The traveling screen was installed in a straight section of the 10 degree converging wall about 10.5 ft downstream from the bend, figure 2. The frame is mounted directly on the floor and in a 2 x 6 stud and plywood support wall. The seal arrangement caused the face of the screen to be offset 1.5 in behind the support wall and screen frame. The open area of the screen began 12.5 in up from the floor.

Test Conditions

For the first test, A, the sides of the traveling screen frame were open behind the wall and flow was able to pass through the side of the frame and not pass through the second layer of the traveling screen. For the second test, B, the sides of the traveling screen frame were enclosed forcing flow through both screen layers.

The screen was tested under a target approach velocity, V_a, of 0.4 ft/s as that is the most widely used standard for screening. Various flow and depth combinations were computed using a spreadsheet targeting the 0.4 ft/s sweeping velocity, V_s, and a V_s/V_a ratio of 1:1 given the flow area in front of the screen and the open area of the screen itself. The final test flow conditions ended up with a depth of 3 ft, a bypass discharge of 3.85 ft^3/s and a diversion or discharge through the screen of 2.35 ft^3/s because of the limitations in the maximum flow into the facility and difficulty measuring higher bypass flows. The screen open area was 31.25 in after subtracting out the width of the seals covering the screen. Computing continuity over the screen open area and depth for the discharge through the screen of 2.35 ft^3/s gives an approach velocity of 0.45 ft/s. A 3 in square grid was used to gather velocity data 3 in out from the front of the screen. A velocity measurement was also gathered about 1.5 in below the open area of the screen. Data were taken over the grid with the following notation: A3, A6, A9....A21, B3, B6....to J21, columns denoted by letters starting with A at the upstream end of the screen and the vertical depth denoted by the number of inches above the seal. A row of data was also taken 1.5 in below the bottom seal, denoted Abottom, Bbottom,...., Jbottom. These data are shown in tables 1 and 2 for the two test configurations.

Figure 2. - Traveling screen installed in the WRRL recirculating flow facility. The screen shown in the right photo is mounted vertically on a 10 degree converging wall between the two walkways spanning the facility.

Additional tests were then conducted with the boxed in frame on the screen:

- Weed debris with the original screen,
- Weed debris with hooks attached to the face of the original screen,
- Fish behavior tests,
- Static loading test.

Velocity Test Results

This section provides the results for both tests A and B. Data provided includes tables of the actual measured velocities, and profile and contour plots of the sweeping and approach velocities.

Test A - For test A, the sweeping and approach velocity data results are shown in table 1. The sweeping and approach velocity profiles and contours are given in figures 3 and 4. The profiles and contour plots show fairly good uniformity of approach flow velocities to the screen. In addition, for the given channel geometry and screen area, the sweeping velocity is decreasing in the downstream direction over the screen. This would be expected given the channel flow rate and the screen and channel areas. Additional flow in the channel that exceeds the capacity of the facility would be required to maintain sweeping velocity across the screen as the flow is drawn through the screen.

The approach velocities indicate generally higher velocities at the upstream end of the screen due to an angle of attack on the screen caused by the screen position in the 10 degree converging channel. The approach velocities then decrease towards the end of the screen. Baffling would be difficult to perform in this type of installation; therefore, the screen area should be oversized compared with meeting continuity to meet velocity criteria. The velocities below the open area of the screen did not show any unusual trend.

The head drop measured across the screen under these operating conditions was 0.75 inches with some flow going through both screen layers and some going out the sides of the frame. The head loss through a typical Wedgewire screen with a typical porosity of about 60 percent would be expected to be 0.08 inches. Therefore, there is more head loss associated with the lower porosity of this screen (32 percent) and passage of the flow through two screen sections than a typical Wedgewire installation. Passing through two layers of screen does tend to improve the uniformity of the velocity distribution where baffling is probably not very easy to accomplish.

Dye was injected in front of the screen to investigate flow patterns across and through the screen. There definitely was an angled component of flow going out between the frame supports on the downstream end of the screen for test A. Potentially this could cause some interference between the frame support for the screen and the approach velocity. In addition, the frame sides might eventually be solid as the technology is further developed. This led to test B, enclosing the sides of the screen frame and measuring velocities again.

Table 1. - Test A velocity data with the original screen installation with the frame open on the sides.

File	Measurement column location across screen in flow direction (x)	Average sweeping velocity V_s (ft/s)	Measurement row vertical distance (y)	Average approach velocity V_a (ft/s)
A21	3	0.78	21	0.45
A18	3	0.77	18	0.47
A15	3	0.78	15	0.50
A12	3	0.75	12	0.49
A9	3	0.78	9	0.50
A6	3	0.77	6	0.48
A3	3	0.73	3	0.45
ABOTTOM	3	0.66	-1.5	0.28
B21	6	0.73	21	0.43
B18	6	0.71	18	0.47
B15	6	0.73	15	0.49
B12	6	0.71	12	0.50
B9	6	0.72	9	0.49
B6	6	0.69	6	0.48
B3	6	0.69	3	0.45
BBOTTOM	6	0.64	-1.5	0.25
C21	9	0.68	21	0.42
C18	9	0.68	18	0.47
C15	9	0.68	15	0.49
C12	9	0.66	12	0.49
C9	9	0.68	9	0.49
C6	9	0.68	6	0.49

File	Measurement column location across screen in flow direction (x)	Average sweeping velocity V_s (ft/s)	Measurement row vertical distance (y)	Average approach velocity V_a (ft/s)
C3	9	0.65	3	0.46
CBOTTOM	9	0.59	-1.5	0.24
D21	12	0.66	21	0.41
D18	12	0.64	18	0.44
D15	12	0.65	15	0.49
D12	12	0.65	12	0.51
D9	12	0.64	9	0.47
D6	12	0.65	6	0.46
D3	12	0.63	3	0.45
DBOTTOM	12	0.58	-1.5	0.24
E21	15	0.62	21	0.43
E18	15	0.61	18	0.46
E15	15	0.62	15	0.48
E12	15	0.61	12	0.49
E9	15	0.61	9	0.49
E6	15	0.60	6	0.46
E3	15	0.62	3	0.46
EBOTTOM	15	0.56	-1.5	0.25
F21	18	0.59	21	0.43
F18	18	0.57	18	0.46
F15	18	0.59	15	0.48
F12	18	0.58	12	0.50
F9	18	0.56	9	0.49
F6	18	0.58	6	0.48
F3	18	0.59	3	0.44
FBOTTOM	18	0.53	-1.5	0.24
G21	21	0.54	21	0.44
G18	21	0.55	18	0.46
G15	21	0.54	15	0.47
G12	21	0.55	12	0.48
G9	21	0.53	9	0.48
G6	21	0.53	6	0.44
G3	21	0.53	3	0.44
GBOTTOM	21	0.50	-1.5	0.24
H21	24	0.48	21	0.41
H18	24	0.49	18	0.45
H15	24	0.48	15	0.45
H12	24	0.48	12	0.46
H9	24	0.47	9	0.46
H6	24	0.47	6	0.45
H3	24	0.49	3	0.43
HBOTTOM	24	0.48	-1.5	0.24
I21	27	0.42	21	0.38
I18	27	0.42	18	0.42
I15	27	0.40	15	0.41
I12	27	0.38	12	0.44

File	Measurement column location across screen in flow direction (x)	Average sweeping velocity V_s (ft/s)	Measurement row vertical distance (y)	Average approach velocity V_a (ft/s)
I9	27	0.39	9	0.42
I6	27	0.40	6	0.41
I3	27	0.43	3	0.39
IBOTTOM	27	0.40	-1.5	0.21
J21	30	0.33	21	0.31
J18	30	0.31	18	0.32
J15	30	0.31	15	0.33
J12	30	0.31	12	0.33
J9	30	0.32	9	0.33
J6	30	0.33	6	0.32
J3	30	0.34	3	0.30
JBOTTOM	30	0.37	-1.5	0.17

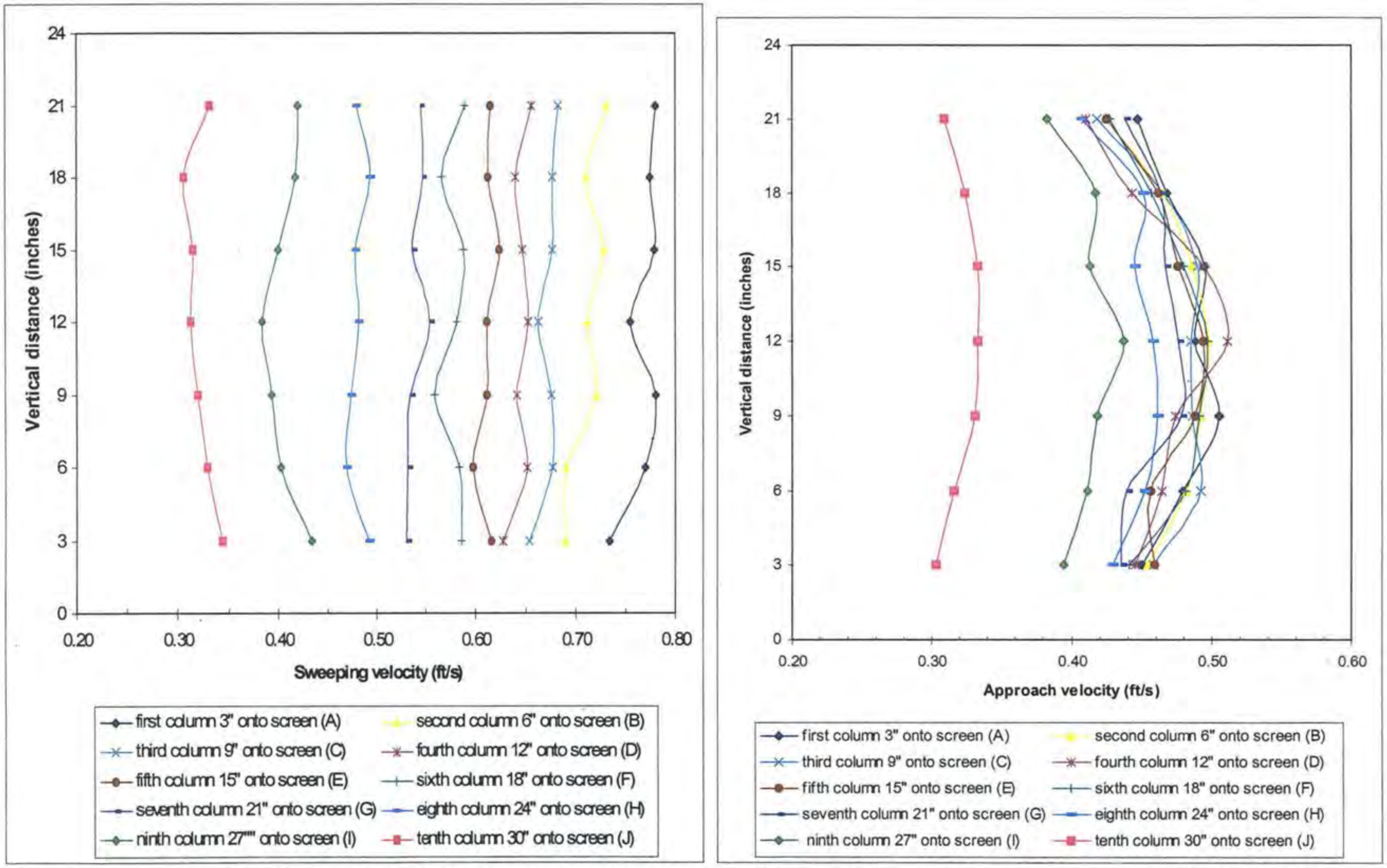


Figure 3. – Test A, vertical velocity profiles for the Intralox traveling screen installed vertically on a 10 degree converging wall. The profiles are shown at 3 inch intervals across the screen starting with column A from the data in table 1. The bottom of the screen open area is at zero. The depth on the screen was about 2 ft; therefore, the last vertical velocity was taken at 21 inches up the screen open area.

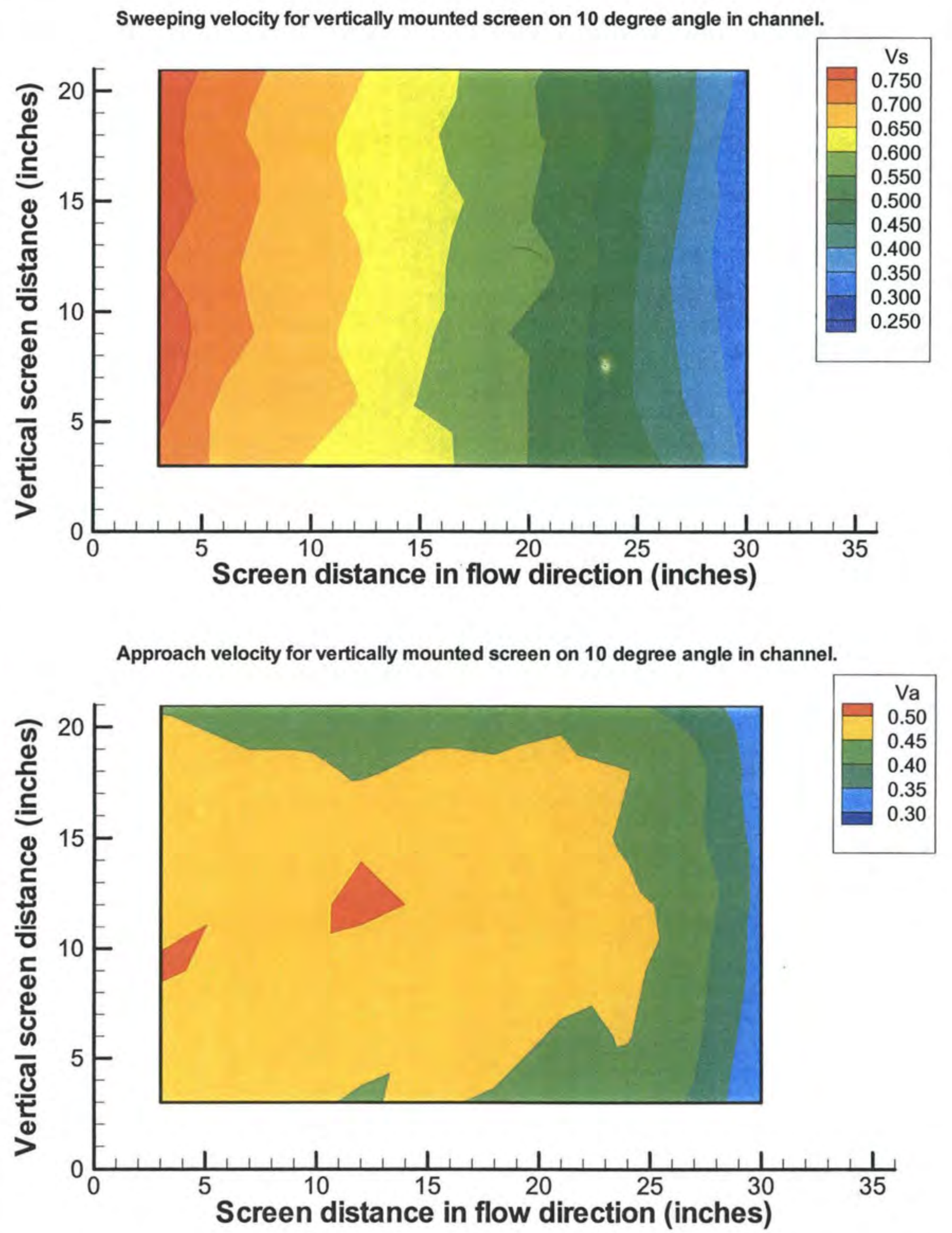


Figure 4. – Test A contour mapping of the sweeping and approach velocities measured 3 inches in front of the traveling screen vertically mounted on a 10 degree angle in the channel. The view is looking at the front face of the screen with the boundary the outermost measurement locations of the grid. Flow is from left to right.

Test B - Test B was conducted with the same discharge ratios and flow depth with the sides of the screen frame enclosed. This will allow determination of whether or not the downstream portion of the screen approach velocity was influenced by the frame and or wall support. The velocity data is shown in table 2 with the sweeping and approach velocity profiles and contour plots shown on figures 5 and 6.

Enclosing the sides of the traveling screen frame should have forced slightly more head loss across the screen because all the flow was now being required to pass through both screens instead of a portion of the flow just through one screen and the downstream end of the support frame. The flow rate and head loss remained the same indicating that there was little difference in the screen performance. Again, passage through both screens produces more head loss than a typical Wedgewire screen application, but also provides a reasonably uniform velocity distribution. Even though the velocities seemed slightly lower, the same trends in sweeping and approach velocities developed with the enclosed frame sides as with the previous tests. The screen should be oversized to accommodate the slightly lower than average approach velocities at the downstream end of the screen. This is probably an easier approach than baffling given the screen geometry.

Table 2. - Test B velocity data with the screen frame boxed in to prevent flow through the sides.

File	Measurement column location across screen in flow direction (x)	Average sweeping velocity V_s (ft/s)	Measurement row vertical distance (y)	Average approach velocity V_a (ft/s)
A3	3	0.69	3	0.42
A6	3	0.72	6	0.46
A9	3	0.73	9	0.47
A12	3	0.73	12	0.47
A15	3	0.75	15	0.45
A18	3	0.75	18	0.45
A21	3	0.74	21	0.43
ABOTTOM	3	0.63	-1.5	0.22
B3	6	0.65	3	0.42
B6	6	0.67	6	0.45
B9	6	0.69	9	0.46
B12	6	0.67	12	0.45
B15	6	0.68	15	0.45
B18	6	0.69	18	0.44
B21	6	0.68	21	0.40
BBOTTOM	6	0.59	-1.5	0.22
C3	9	0.61	3	0.41
C6	9	0.64	6	0.45
C9	9	0.65	9	0.46
C12	9	0.65	12	0.46
C15	9	0.65	15	0.45
C18	9	0.66	18	0.44
C21	9	0.65	21	0.40
CBOTTOM	9	0.57	-1.5	0.22

File	Measurement column location across screen in flow direction (x)	Average sweeping velocity V_s (ft/s)	Measurement row vertical distance (y)	Average approach velocity V_a (ft/s)
D3	12	0.60	3	0.41
D6	12	0.62	6	0.44
D9	12	0.61	9	0.44
D12	12	0.62	12	0.46
D15	12	0.62	15	0.46
D18	12	0.62	18	0.44
D21	12	0.60	21	0.39
DBOTTOM	12	0.55	-1.5	0.21
E3	15	0.59	3	0.42
E6	15	0.58	6	0.44
E9	15	0.59	9	0.45
E12	15	0.59	12	0.45
E15	15	0.58	15	0.46
E18	15	0.59	18	0.44
E21	15	0.58	21	0.40
EBOTTOM	15	0.51	-1.5	0.21
F3	18	0.55	3	0.40
F6	18	0.54	6	0.44
F9	18	0.54	9	0.45
F12	18	0.54	12	0.46
F15	18	0.54	15	0.44
F18	18	0.56	18	0.43
F21	18	0.54	21	0.39
FBOTTOM	18	0.49	-1.5	0.21
G3	21	0.51	3	0.39
G6	21	0.51	6	0.42
G9	21	0.51	9	0.44
G12	21	0.51	12	0.44
G15	21	0.51	15	0.43
G18	21	0.51	18	0.42
G21	21	0.51	21	0.39
GBOTTOM	21	0.48	-1.5	0.21
H3	24	0.48	3	0.38
H6	24	0.47	6	0.41
H9	24	0.46	9	0.42
H12	24	0.45	12	0.42
H15	24	0.45	15	0.42
H18	24	0.45	18	0.41
H21	24	0.45	21	0.37
HBOTTOM	24	0.43	-1.5	0.19
I3	27	0.42	3	0.35
I6	27	0.40	6	0.36
I9	27	0.40	9	0.39
I12	27	0.39	12	0.39
I15	27	0.39	15	0.39

File	Measurement column location across screen in flow direction (x)	Average sweeping velocity V_s (ft/s)	Measurement row vertical distance (y)	Average approach velocity V_a (ft/s)
I18	27	0.38	18	0.37
I21	27	0.39	21	0.33
IBOTTOM	27	0.40	-1.5	0.17
J3	30	0.35	3	0.28
J6	30	0.33	6	0.30
J9	30	0.30	9	0.31
J12	30	0.31	12	0.31
J15	30	0.33	15	0.31
J18	30	0.32	18	0.30
J21	30	0.31	21	0.27
JBOTTOM	30	0.38	-1.5	0.13

An observation during both tests was that at locations C3, D6, E6, and F6 the ADV probe began noticeably vibrating in the flow. The standard deviation of the velocity readings increased dramatically, but the average velocity values remained similar to the surrounding velocity averages. Upon moving the probe to a higher position on the screen the vibration ended immediately. There was no noticeable reason for this to occur, but perhaps the manufacturer would want to investigate this further as it may cause undo loading on the screen.

The standard deviation of the data was consistently about 0.06 to 0.07 ft/s. When the probe was vibrating in the flow, the standard deviation increased to about 0.15 ft/s. The contour plots were developed based upon an interval of 0.05 ft/s allowing interpretation based upon a value close to ± 1 standard deviation.

Some consideration should be given to modifying the framework to surround all the axle rods and gears needed to turn the belt. Protrusions beyond the sides of the frame made it difficult to wall in the sides of the frame. In addition, the frame should be designed for easy removal and replacement of the belt for maintenance or repair in a field application.

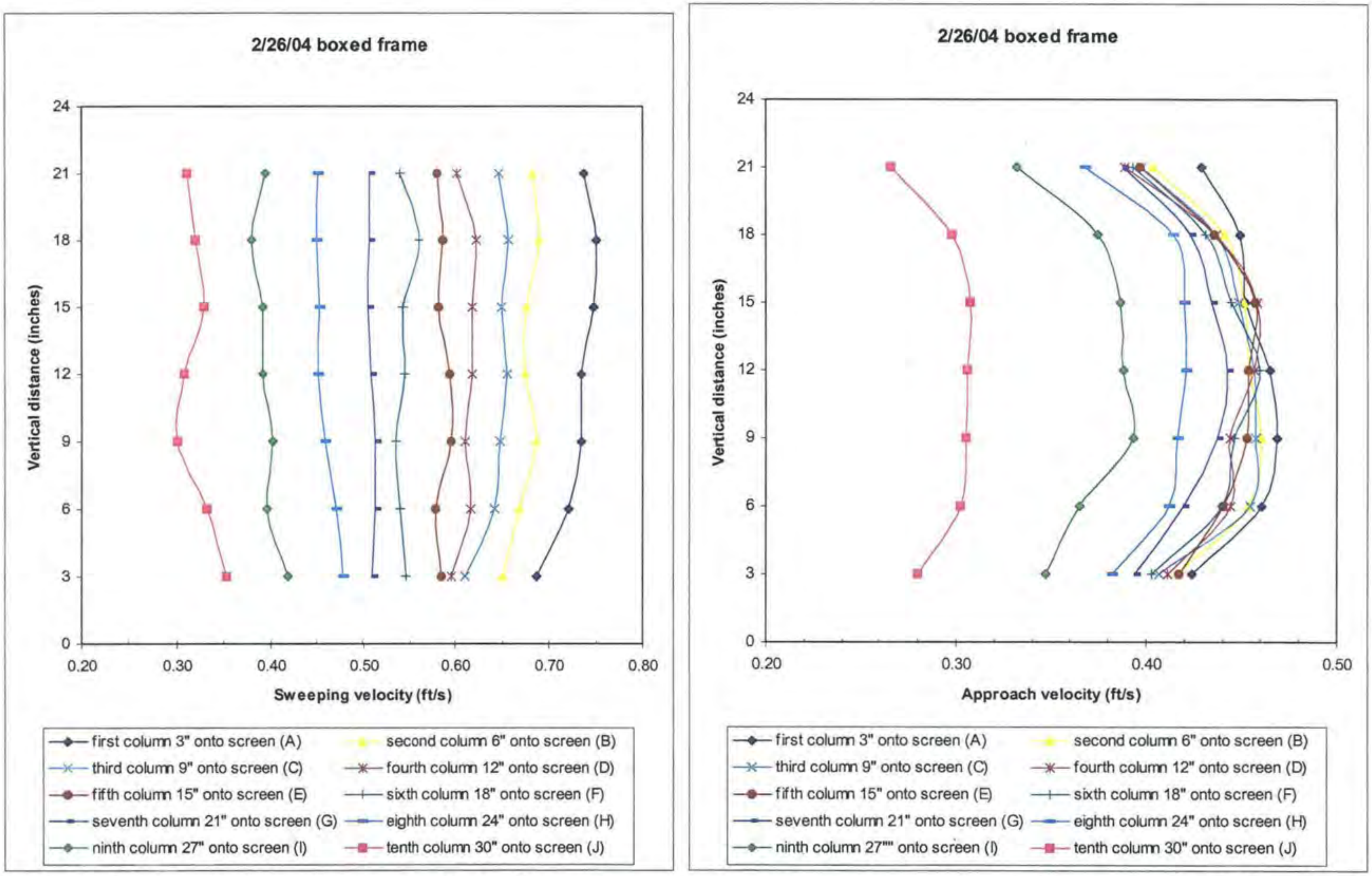


Figure 5. - Test B vertical velocity profiles for the Intralox traveling screen installed vertically on a 10 degree converging wall with the enclosed frame. The profiles are shown at 3 inch intervals across the screen starting with column A from the data in table 2. The bottom of the screen open area is at zero. The depth on the screen was about 2 ft; therefore, the last vertical velocity was taken at 21 inches up the screen open area.

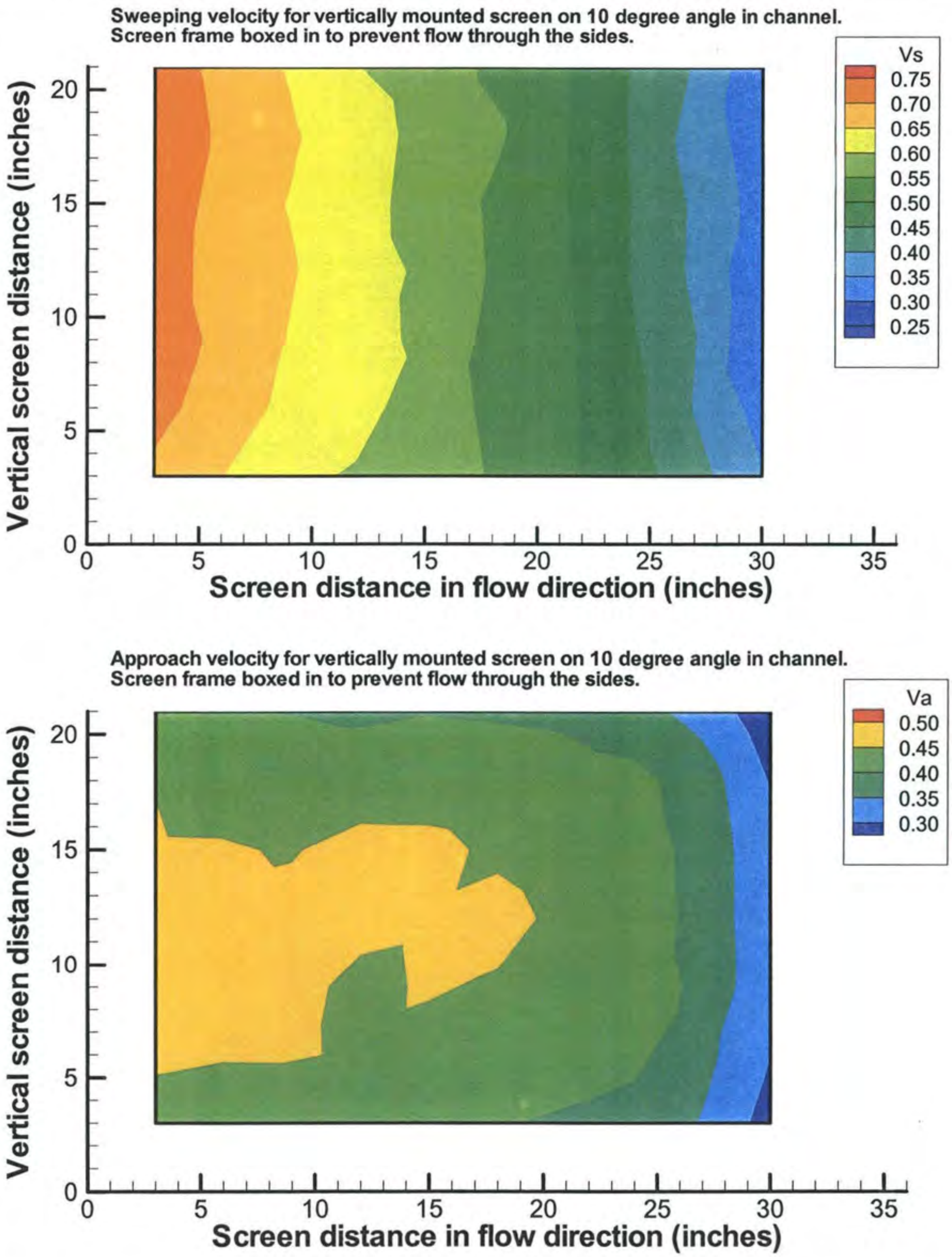


Figure 6. – Test B contour mapping of the sweeping and approach velocities measured 3 inches in front of the traveling screen vertically mounted on a 10 degree angle in the channel with the frame enclosed on the sides. The view is looking at the front face of the screen with the boundary the outermost measurement locations of the grid. Flow is from left to right.

Debris Test Results

The next series of tests were performed to determine the effectiveness of the screen in removing debris. Two types of debris were used; duckweed and egaria. A fine debris screen was installed downstream from the traveling screen and upstream of the bypass pipe to prevent debris passing the traveling screen from clogging the pipe.

Original Screen Configuration - The original traveling screen installed vertically on the 10 degree angled wall was tested with debris first. The same 0.45 ft/s approach and initial sweeping velocity of about 0.75 ft/s were set in the flume. A five gallon bucket was filled with egaria and gradually released upstream in the sweeping flow. The smooth surface of the screen and the sweeping velocity did not allow the screen to pick up any of the egaria. The weeds essentially balled up at the downstream end of the screen against the frame (figure 7) until it was swept downstream by the sweeping velocity.

Figure 7. - Egaria weed was released upstream from the screen and "balled up" near the downstream end of the screen before being swept downstream to the bypass. No egaria was captured by the original traveling screen.

A small amount of duckweed was then released from the same location upstream from the screen. The duckweed immediately stuck to the screen material and was drawn up and over the top of the traveling screen. The duckweed was removed as the screen rotated and came in contact with the water surface and flow through the screen on the backside of the screen. The cross member of the screen frame scraped weeds from the backside of the screen and might need to be spaced further away from the screen. Figure

8 shows the effectiveness of the screen in removing duckweed with no modifications. The lower right hand photo in figure 8 shows the amount of duckweed that passed by the screen.

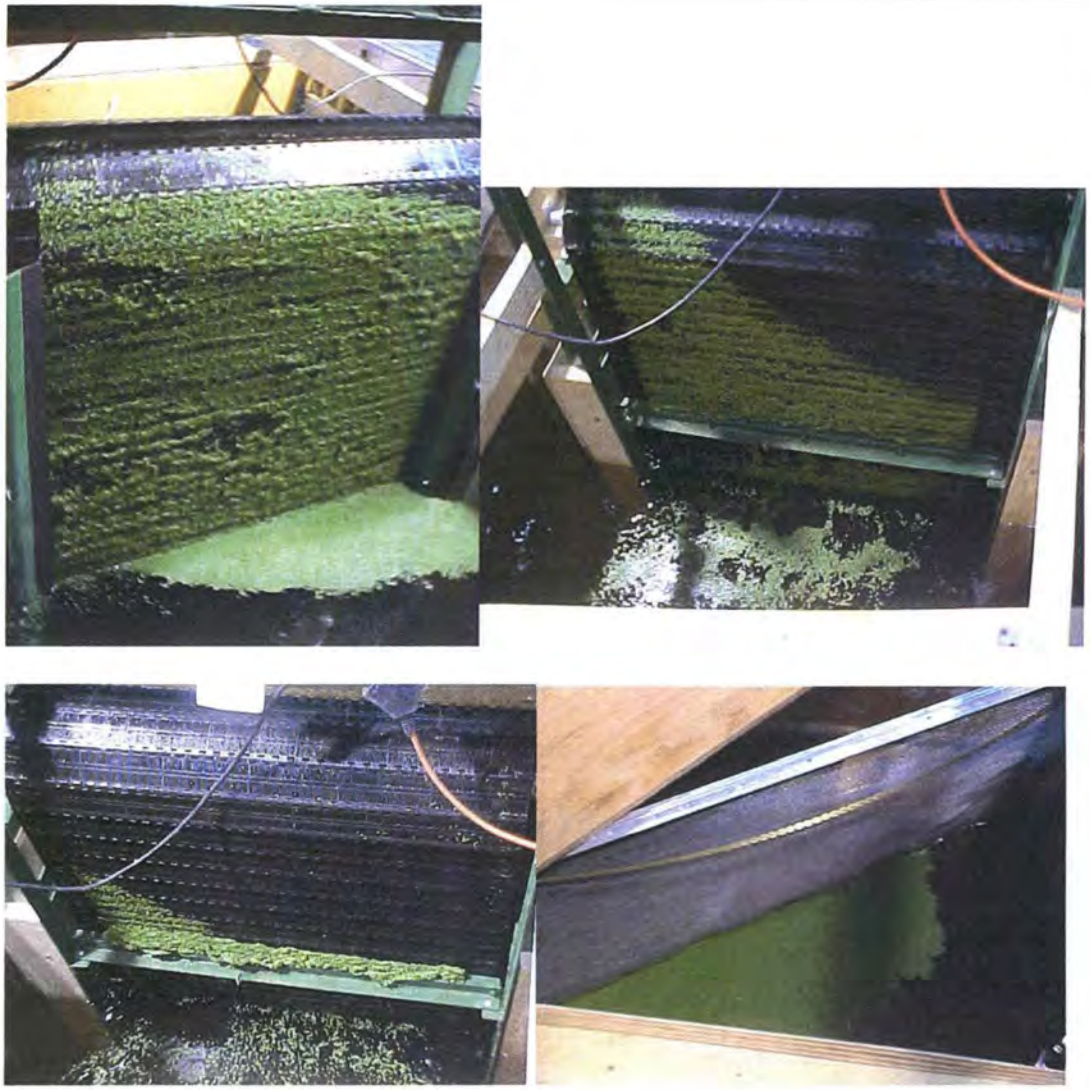


Figure 8. - Duckweed experiments on the original screen. Upper left is the duckweed sticking to the screen (flow from left to right). Upper right is the back side of the screen with the weed washing off with flow through the screen. Lower left is the weed material accumulating on the middle frame support. Lower right is the duckweed that passed by the screen and was captured on the screen upstream from the bypass pipe.

Debris Hooks Added to Screen - The manufacturer then installed a series of metal hooks to the face of the screen by screwing them into the material. The purpose was to grab and lift the weed material. Duckweed was not retested because the original screen was effective in removing it. Throughout the day of testing, we eventually added more and more hooks to the screen until the majority of the agaria was removed by the hook system on the screen.

The initial hooks were ¾ inches long with a small ball on the end. Observations from each test led to the addition of more hooks. Eventually, we ran out of hooks so screws were used for test 3. More hooks were purchased (without the balls on the end) for test 4 and all hooks were used. Four tests sequences were conducted. Figures 9-12 shows a schematic of the hook pattern and photos of the subsequent debris test.

Figure 9 shows test 1 with the hooks evenly spaced on 10 inch rows with 6 inches between the side seals and the hooks and between the hooks. It was observed that most of the weed material swept to the downstream end of the screen. The sweeping velocity decreased toward the downstream end of the screen and the weeds gathered and were formed into a ball. The ball of weeds was too large for the hooks to pick much up. Some weeds were captured at various locations along the screen, but the hook spacing was too far apart and a lot of the weeds fell back off the screen because of a lack of support.

Figure 9 – Test 1, hooks of ¾" lengths with a ball on the end were installed on 10 inch rows with 6 inches between hooks in each row. Flow is from left to right in the photos.

For the second series of debris testing, the number of rows of hooks was doubled. This put hooks on 5 inch row spacing and about every 6 inches laterally. Figure 10 shows the hook pattern and more debris being captured compared to the first test. The main observation from the first debris test was that the weeds were swept downstream too quickly before being captured. It seemed as if less spacing between the rows of hooks would provide more hooks at the water surface, thus more opportunity to capture the weeds. This was somewhat successful, but there still seemed to be a lack of hooks.

TEST CONFIGURATION – 2

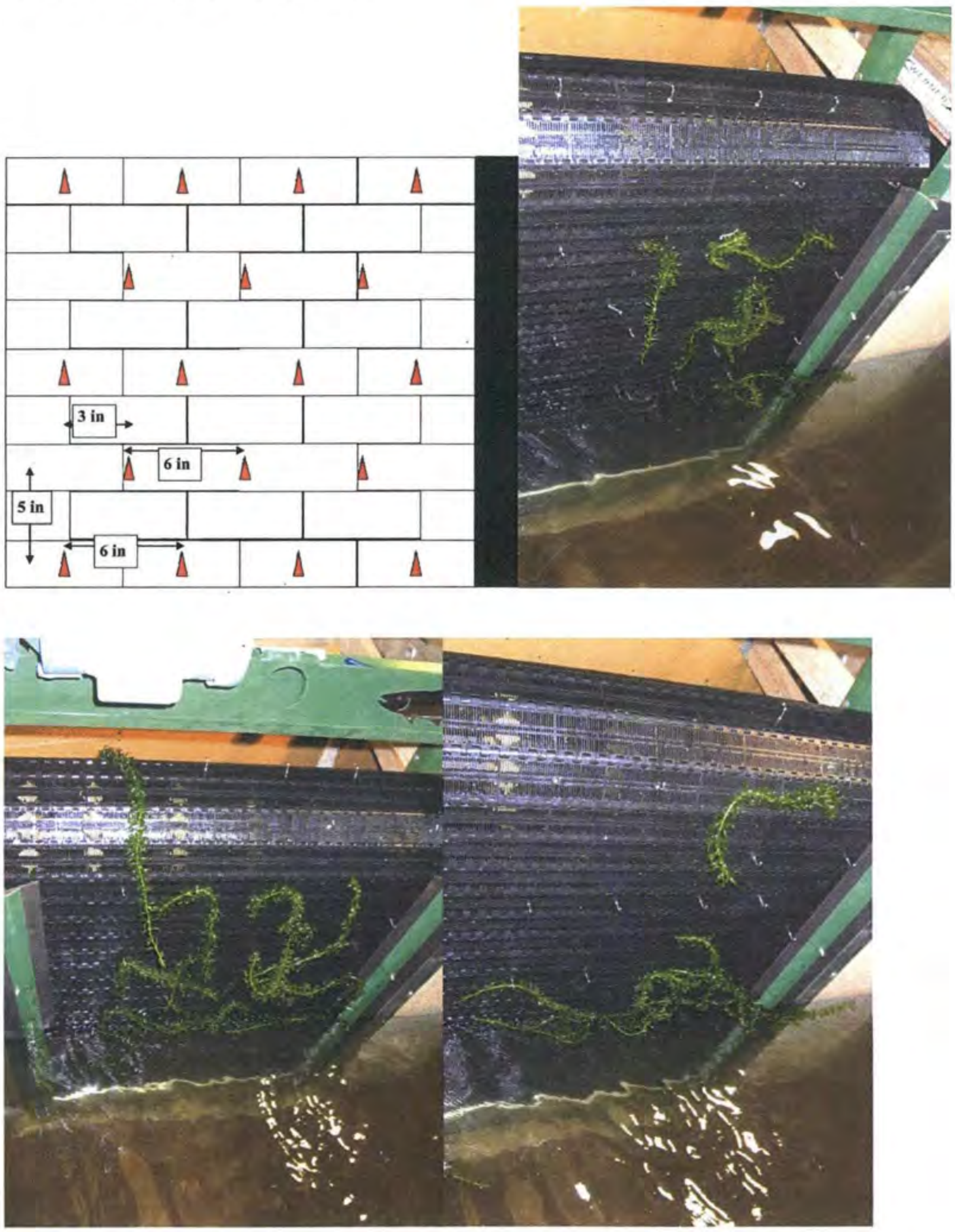


Figure 10. – Test 2, an additional row of hooks offset 3 inches from the previous row. Hooks are installed on rows 5 inches apart, each row staggered 3 inches laterally with 6 inch spacing between hooks in each row. Flow is from left to right in the photos.

Test 3 featured hooks added primarily at the downstream end of the screen to capture more material after it gathered. A hook was added to each screen panel and hooks placed 3 inches from the seal at the downstream end of the screen. Figure 11 shows the hook pattern and that more weed material was definitely captured. This led to the denser hook pattern over the entire screen for test 4.

TEST CONFIGURATION - 3

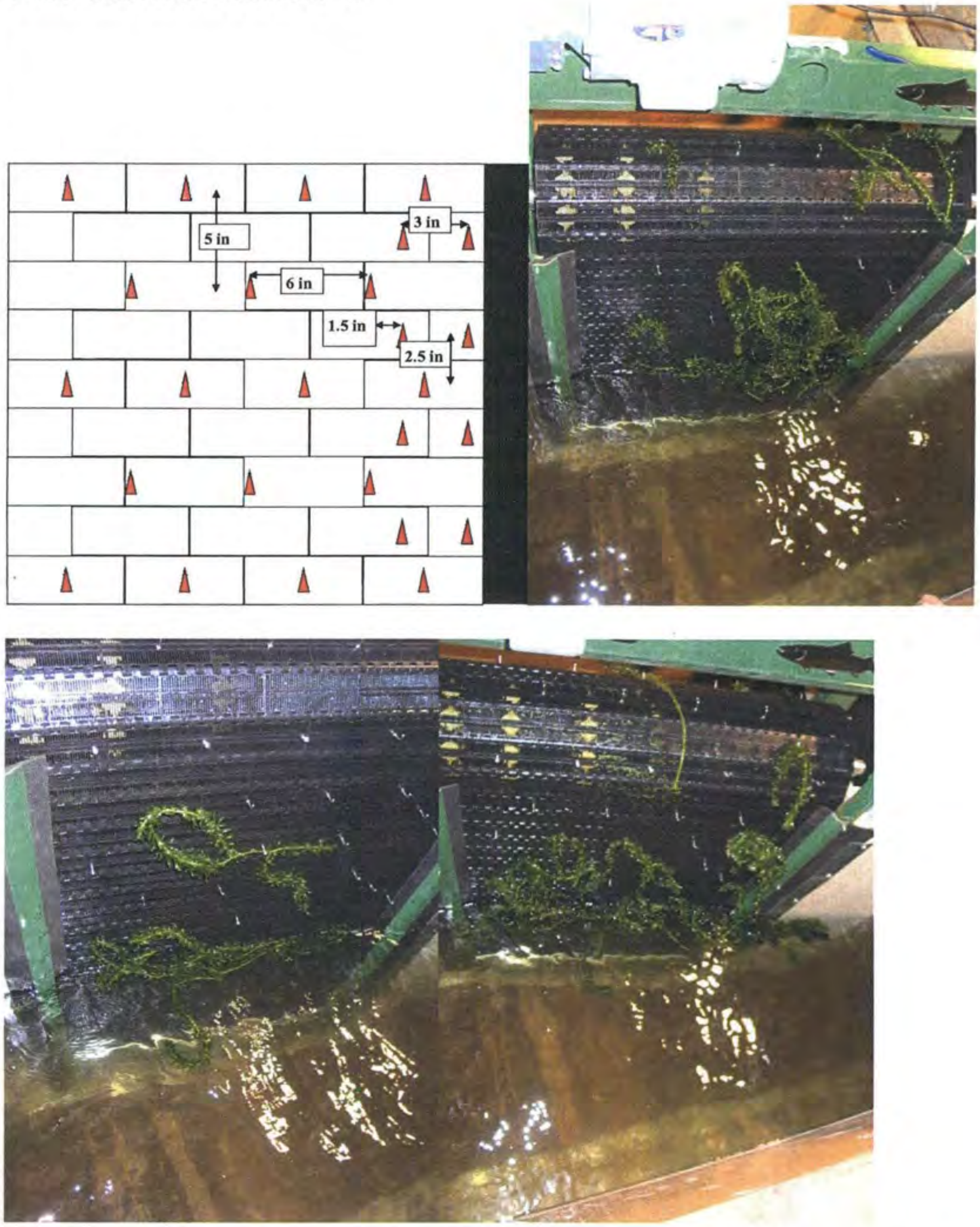


Figure 11. - For test 3, more hooks were added at the downstream end of the belt, basically doubling the number of hooks between the previous last column of hooks and the seal at the downstream end of the screen. A hook was added to each screen panel so that there was 2.5 inches between the rows. Flow is from left to right in the photos.

Test 4 was the final test, figure 12. The hook pattern from the downstream end of the screen in test 3 was duplicated throughout the screen face. The hook pattern ended up with a row on every screen panel on 2.5 inch centers and hooks spaced every 6 inches laterally with each row of hooks staggered 3 inches from the previous. This allowed more debris to be captured sooner because there were more hooks in contact with the water surface when the weeds first hit the screen and while the screen traveled up. Figure 12 shows the hook pattern and the efficiency with which this screen removed debris with only a very few pieces of debris passing by the screen.

TEST CONFIGURATION – 4

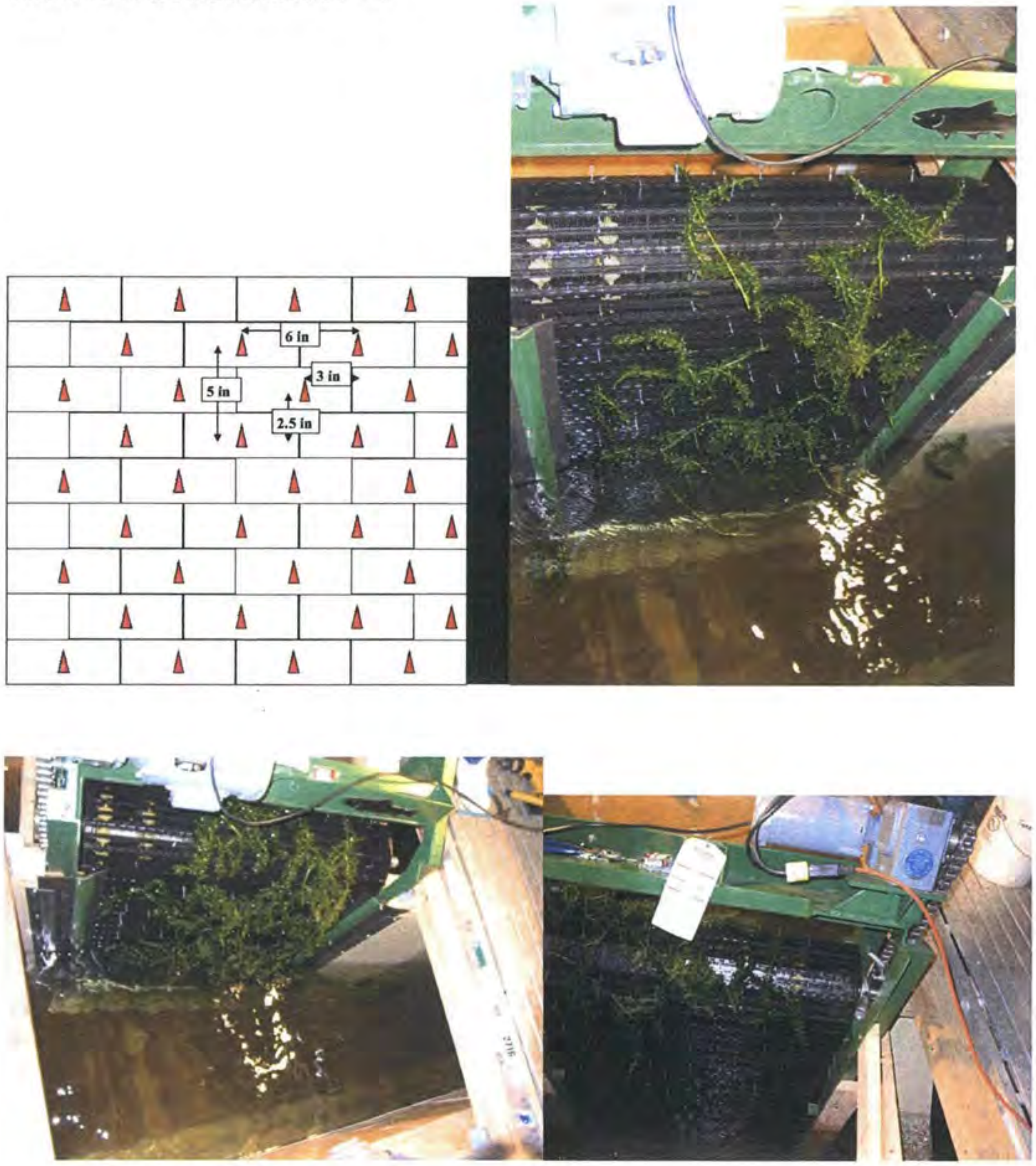


Figure 12. – For test 4, the number of hooks was doubled over the entire surface of the belt. Row spacing is 2.5 inches with 6 inch hook spacing laterally. Each row began with a 3 inch staggering of the first hook. Flow is from left to right in the photos. The photo in the lower right shows the back side of the screen where weed material either fell off or was washed off at the water surface.

The screen with the staggered hook pattern with a hook centered in each panel performed very efficiently at removing the agaria. There was a hook at the water surface nearly all the time to grab weed material and there were enough to keep the material on the screen.

We discussed a dead end or inclined screen installation and it was agreed that a vertical installation with a sweeping flow would be the worst case scenario. Basically, it was felt that because the traveling screen performed well with a sweeping velocity it would likely perform even better with an inclined or dead end situation.

How the hooks might be constructed and attached was also discussed. The hooks tested were very small and may prove to be too fragile in a field application. However, the brush seal at the bottom of the screen was never compromised as the bristles would split to let the hooks through and were snug around the hooks. Bigger hooks have been tested by Reclamation with other screens and not had successful bottom sealing. Intralox felt that they could try molding something into the material or would think about a sturdier hook other than these that were commercially available and useful for the laboratory tests.

Fish Test Results

A one time fish test was conducted with the debris hooks mounted on the traveling screen. A squeaking noise is made by the screen traveling on the gears which is probably a detour ant to the fish. The active screen material is located about a foot above the floor because of how the screen is mounted on the frame.

Twenty each of fathead minnows between 2 to 1.3 in inches long and rainbow trout between 5.8 to 6.3 inches long were released into the channel downstream from the traveling screen. The fish remained in the facility for about ½ hour. The majority of the fish swam upstream past the screen on the bottom. Therefore, most of the fish did not go near the screen at all. Those fish traveling near the screen appeared to avoid the screen and the hooks. There was one exception. A fathead minnow stayed near the screen for about 15 minutes with its tail occasionally contacting a hook. The minnow did not seem distressed by contact with the hooks or by being close to the screen. The minnow eventually swam out away from the screen and went downstream of its own volition.

Hydraulic Loading Results

Many field installations experience unbalanced hydraulic loading if the screen becomes unexpectently clogged with debris. This may cause severe loading conditions on the screen and could lead to failure of the screen. Most screens are structurally designed for a 2 ft loading differential, sometimes more, depending upon the expected debris load.

A sheet of plastic was attached to the hooks and covered the face of the screen including the seals, figure 13. The model was filled with water to a depth of 4 feet on both sides of the screen. A valve was then opened on the diversion side or behind the screen to lower the water level and produce the differential. Unfortunately, the center wall of the model was designed for equal loading on both sides and failed during two separate attempts to produce a 2 ft differential. The most differential that was obtained was about 8 inches. The model was then drained, the plastic removed, the screen and seals inspected and the motor turned on to see if screen would travel correctly after experiencing this load.

Figure 13. - A double thickness of plastic sheeting was attached to some of the hooks on the face of the screen to hold it in place over the screen and seals for a loading test simulating a debris clogged screen.

The screen material, gears, and seals looked in good condition after the test. There were no discontinuities or bulges in the screen material and it traveled without difficulty.

Appendix A

Intralox Series 1800 Manufacturers Specifications

Mesh Top

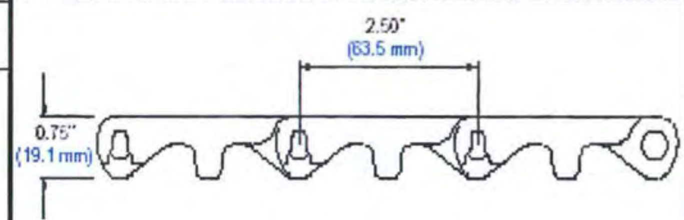
	in.	mm
Pitch	2.50	63.5
Minimum Width	5.00	127.0
Width Increments	1.00	25.4
Opening Size (approximate)	0.068 x 0.75	1.7 x 19.1
Open Area	32%	
Hinge Style	Open	
Drive Method	Center-driven	

Product Notes

- See important Belt Width Measurement note on page 15.
- Fully flush edges with recessed rods prevent edge damage and rod migration.
- Stocked in white and UV resistant black polypropylene, natural polyethylene and UV resistant acetal.
- Available with Flights and other Series 1800 accessories.

Additional Information

- See "BELT SELECTION PROCESS" on page 5
- See "STANDARD BELT MATERIALS" on page 16
- See "SPECIAL APPLICATION BELT MATERIALS" on page 16
- See "FRICTION FACTORS" on page 21



Belt Data

Belt Material	Standard Rod Material Ø 0.312 in. (7.9 mm)	BS Belt Strength		Temperature Range (continuous)		W Belt Weight		Agency Acceptability						
		lb/ft	kg/m	°F	°C	lb/sq ft	kg/sq m	FDA (USA)	USDA-FSIS - Meat & Poultry	USDA Dairy[a]	CFA[b]	A[c]	Z[d]	MC[e]
Polypropylene	Polypropylene	800	1190	34 to 220	1 to 104	1.44	7.03	•						White
UV Resistant PP	Acetal	1100	1640	34 to 200	1 to 93	1.55	7.56							
UV Resistant Acetal	Acetal	1500	2230	-50 to 200	-46 to 93	2.27	11.08							
Polyethylene	Polyethylene	400	595	-50 to 150	-46 to 66	1.50	7.32	•						

a USDA Dairy and MAF acceptance require the use of a clean-in-place system.
b Canada Food Inspection Agency
c Australian Quarantine Inspection Service
d New Zealand Ministry of Agriculture and Fisheries
e MC - Migration Certificate providing approval for food contact according to the Italian Law D.M. 21.03.73

Sprocket and Support Quantity Reference

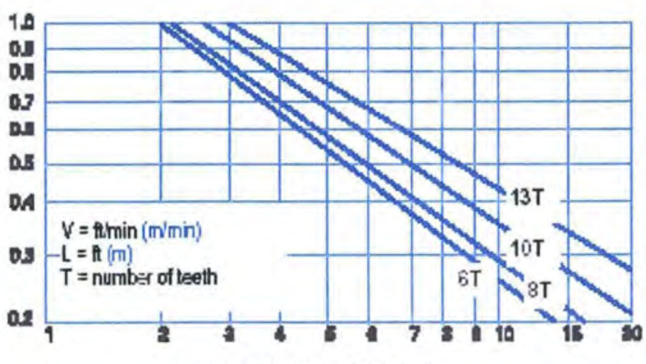
Belt Width Range[a]		Minimum Number of Sprockets Per Shaft[b]	Wearstrips	
in.	mm		Carryway	Returnway
5	127	1	2	2
6	152	2	2	2
7	178	2	2	2
8	203	2	2	2
9	229	2	2	2
10	254	2	3	2
12	305	3	3	2
14	356	3	3	3
15	381	3	3	3
16	406	3	3	3
18	457	3	3	3
20	508	3	4	3
24	610	5	4	3
30	762	5	5	4
32	813	5	5	4
36	914	7	5	4
42	1067	7	6	5
48	1219	9	7	5
54	1372	9	7	6
60	1524	11	8	6
72	1829	13	9	7
84	2134	15	11	8
96	2438	17	12	9
For Other Widths, Use Odd Number of Sprockets[c] at Maximum 6 in. (152 mm) ℄ Spacing			Maximum 9 in. (229 mm) ℄ Spacing	Maximum 12 in. (305 mm) ℄ Spacing

a If your belt width exceeds a number listed in the table, please refer to the sprocket and support material minimums for the next larger width range listed. Belts are available in 1 in. (25 mm) increments beginning with minimum width of 6 in. (127 mm). If the actual width is critical, consult Customer Service.
b These are the minimum number of sprockets. Additional sprockets may be required for heavily loaded applications.
c The center sprocket should be locked down. With only two sprockets, fix the sprocket on the drive journal side only.

SECTION 2

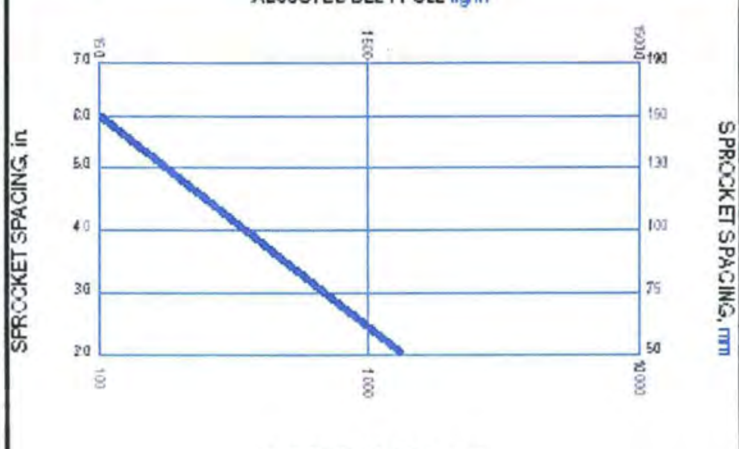
1800

S Strength Factor



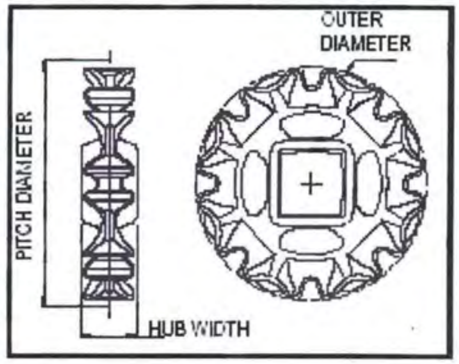
Divide belt speed "V" by the shaft ℄ distance "L". Strength Factor is found at intersection of speed/length ratio and appropriate sprocket line. See page 25 for more information.

Sprocket Spacing as a Function of Belt Pull



EZ Clean Sprocket Data

No. of Teeth (Chordal Action)	Nom. Pitch Dia. in.	Nom. Pitch Dia. mm	Nom. Outer Dia. in.	Nom. Outer Dia. mm	Nom. Hub Width in.	Nom. Hub Width mm	Available Bore Sizes			
							U.S. Sizes		Metric Sizes	
							Round in.	Square in.	Round mm	Square mm
6 (13.40%)	5.0	127	4.6	117	1.5	38		1.5		40
8 (7.61%)	6.5	165	6.2	157	1.5	38		1.5		40
10 (4.89%)	8.1	206	7.8	198	1.5	38		1.5		40
13 (2.91%)	10.5	267	10.3	262	1.5	38		1.5		40
								2.5		60



Impact Resistant Flights

Available Flight Height		Available Materials
in.	mm	
4.0	102	Polypropylene, Polyethylene, Acetal

Note: Flights can be cut down to any height required for a particular application.

Note: Each flight rises out of the center of its supporting module, molded as an integral part. No fasteners are required.