TESTING SUMMARY

Stormceptor® ¼ Scale Laboratory Test
National Water Research Institute

Initial laboratory testing of the Stormceptor for oil and sediment removal was conducted on a 1:4 scale model in 1993 and 1994 at the National Water Research Institute in Burlington, Ontario. The prototype size of Stormceptor that corresponds to the model is the 1800 U.S. (1500 Cdn). This laboratory testing evaluated several drop pipe (inlet and outlet) configurations, and the inclusion of internal energy dissipation/flowpath baffles with respect to the performance of the Stormceptor for oil and sediment removal at different flowrates. All flow values and physical dimensions presented in this summary have been scaled up from model scale to prototype scale (full scale).

TSS Removal Performance

ABS resin pellets were used to scale down the particle settling velocities for use in the 1:4 model to correspond to a medium sand (particle size 80 – 230 μm). ABS pellets were used to achieve the smaller settling velocities in the model scale recognizing that procuring/handling the extremely small particle sizes required for the model scale testing would be difficult.

Sediment removals were strongly affected by the magnitude of discharge through the lower separation chamber. Figure 1 shows the relationship between TSS removal rate versus separation/storage chamber treatment flowrate.

Figure 1. Fine Sand Removal
1800 U.S. (1500 Cdn)

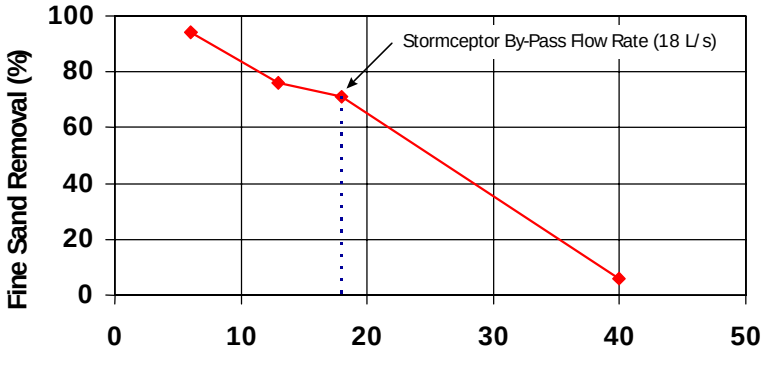

Figure 1 indicates that the performance of the Stormceptor size tested varies almost linearly with treatment flowrate. The full scale Stormceptor that corresponds to the model treats a maximum of 285 USgpm (18 L/s) (prior to by-passing). Figure 1 shows that flowrates higher than this rate result in decreased performance and potential scour and resuspension beyond 634 USgpm (40 L/s).

(More information on the back of this page)

Oil Removal Performance

Free oil removal (olive oil; SG = 0.916) was observed under two simulated conditions: dry weather conditions (no flow) and typical flow conditions (normal storms). Under both conditions oil was transported into the treatment chamber. Oil remained in the inlet downpipe after a simulated dry weather spill (no flow) but was purged into the separation chamber with subsequent flows (48 USgpm (3 L/s) to 111 USgpm (7 L/s)).

ADDITIONAL RESULTS

Baffles

The use of baffles marginally increased TSS removal performance (<5%).

Treatment Flow Rate

The maximum treatment flow rate prior to by-passing was measured in the Stormceptor for three configurations. The maximum measured treatment flow rate (before by-passing) was 348 USgpm (22 L/s) for a 6” (150 mm) diameter inlet drop pipe and 554 USgpm (35 L/s) for a 8” (200 mm) diameter drop pipe.

Outlet Riser Pipe Diameters

Several other outlet riser pipe diameters (8” (200 mm), 12” (300 mm) and 16” 400 mm)) were tested. Testing showed that these sizes of outlet riser pipes did not affect the performance of the Stormceptor for sediment removal.

Treatment Flow Rate During By-pass

The peak treatment rate during by-pass was 10% greater than the treatment rate when by-pass first started. As the influent flow was subsequently increased beyond this point the actual discharge through the lower chamber decreased to 80% of the treatment rate when by-pass first started. These results indicate that the risk of scouring material from the separator during periods of peak flow is reduced.