

Western Canadian Spill Services Ltd.
FIELD TESTING AND IMPROVEMENT REPORT
Lamor Bow Collector, Canadyne Inflatable Boom Testing
And Modified Rake Anchor
June 4th And 5th 2008
Prepared by Mike Locke, WCSS Oil Spill Advisor

BACKGROUND

Western Canadian Spill Service Ltd (WCSS) purchased a Lamor Bow Collector (skimmer) and 500m of Inflatable Lake Boom on a boom reel in 2007. In early 2008, this equipment was mounted on a suitable boat and trailer and a field testing exercise was held on June 4th and 5th 2008. Also in 2008, some existing anchors were modified and a diesel powered self priming trash pump was purchased. The main objectives of the session were to:

- test the effectiveness of the new equipment in both lake and river conditions
- Identify potential safety issues and upgrades to the equipment
- Develop operational manuals for the new equipment
- train potential responders who may use the equipment

There were also individual objectives identified for each piece of equipment.

Bow Collector Testing Objectives

1. Identify issues linked to mounting the bow skimmer on our vessel.
2. Test the ability to safely get on step and travel on rivers and lakes. This exercise included evaluating turning at low speeds and holding in-stream.
3. Test the ease and safety of raising and lowering the bow collector in surface water.
4. Test the ease and safety of operating the bow collector.
5. Identify what issues need to be addressed in the operations manual.
6. Test what range of speeds can be used when the bow collector is lowered and in place.
7. Look at options for temporary fluid collection.
8. Consider having a picker truck on site to evaluate ease and timing to remove and replace the skimmer on the boat.
9. Evaluate options for attaching boom to the bow collector in order to increase containment area.

1. BOW COLLECTOR

The Bow Collector is a Lamor LBC 2700M series which operates on chain brush conveyor technology and comes complete with side arms and a combination Diesel Power Pak and Double Diaphragm pump. It is mounted on an 8m long Twin Engine Aquadek workboat.

The bow collector mounted on the Aquadek workboat is considered to be an advancing skimmer. An advancing skimmer provides the following benefits:

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| River | 1) | Skimmer can easily move into accumulations of oil on surface water that is stranded in back-eddies or contained along a shoreline. |
| | 2) | Skimming unit can be placed in the center of a channel if an oil slick is migrating downstream away from the shoreline where the current velocity does not exceed the skimming capacity. |
| Lake | 1) | Skimming can take place away from the shoreline and directed into the thick portion of the spill. |





Bow Collector



Bow Collector mounted on WCSS barge

The bow collector was first tested on June 4th at Wizard Lake to take advantage of calm waters. The following day, the testing took place on the North Saskatchewan River near Devon, Alberta. Following are some highlights of the two days of testing the Bow Collector.

1. The Twin Barge is very well suited for the Bow collector and handles very well in all modes of operation including slow speed, getting on step and turning. The bow collector wings somewhat restricts forward visibility when in travel mode, but the general feeling was that it is not a safety issue that needs to be addressed.
2. The operating manual provided by Lamor is complete and requires very few revisions.
3. The optimum operating speed for the bow collector appears to be around 2 knots and the maximum is 3-3.5 knots.
4. The diesel power pak is quite noisy, although the highest noise level was 83db which is below the maximum continuous working level of 85db. There may be an opportunity to use the existing hydraulics on the boat, which may eliminate the need for the power pak on the boat.
5. It is recommended that a small working deck be designed for the front of the boat so operators can safely clear out debris from the skimmer brushes.
6. Although we did not test this, it appears that sections of boom could be added to either the front of the boat, or to the bow collector which would increase the containment area. This technique was observed in September 2008 on the Delaware River at a major oil spill response exercise. (McFadyen 2008).

2. INFLATABLE BOOM AND REEL

The inflatable boom is Canadyne Model 8/16 Air Boom MPS (1500ft) and is complete with a boom storage reel and tandem trailer. The trailer also has 10 sets of anchor assemblies along with 2 air blowers, spare rope and chain, and ATSM to Shotgun adaptors.

The following objectives were identified for the two day exercise:

1. Review standard equipment list for the unit and identify additional needs. Test whether the equipment is properly located on the trailer.
2. Identify how much inflatable boom can be towed with a single engine jet boat as well as with the twin barge.
3. Identify how fast the inflatable boom can be safely rolled off the boom reel.
4. Identify the best option for inflating the boom.
5. Evaluate the number and type of anchors best suited to anchor the boom.
6. Evaluate the effectiveness of the boom in rough water conditions.
7. Evaluate the ability to roll the boom back onto the rope reel. Identify what size of power pak is required.





The Inflatable boom was tested on June 4th at Wizard Lake to take advantage of calm waters. The boom was not tested in river conditions.

1. The boom reel and boom operates on the same standard size Yanmar Diesel power pak's which are used on the hydraulic skimmers. This eliminated the need to purchase a special power pak.
2. The boom rolls off of the reel very easily and can be managed by a crew of 3 or 4 people. There is an issue with the location of the hydraulic levers on reel as the operator cannot see the inside of the reel from where he stands on the trailer. These levers will be moved lower onto the reel to improve the operator's visibility.
3. The WCSS twin barge easily pulled the 1500 ft off of the reel and into the lake. Once the boom was in the water the Roughneck boat could also pull the entire string of boom
4. The first 4 sections of boom were inflated using backpack style air blowers. The average time to inflate a 100 ft section of boom was 6 seconds, which allowed the complete deployment of the boom in less than 20 minutes. The crew also tried inflating the boom from a boat once it was in the water and was able to safely do this fairly quickly. There was a recommendation from the crew to provide a longer hose for the air blower, to make it easier to inflate.

5. When the boom was deployed, one of the boats created waves to test the ability of the boom to operate in rough conditions. Based on the testing, it appears that the boom would be effective in at least .5m waves.
6. The boom rolled back onto the reel very easily as well. Crews would open the air valves and allow the weight of the boom rolling onto the reel to force air out of the bladders without slowing down operation of the boom reel. When bringing the boom back onto the trailer, the operation needed to be stopped where the connectors are, so the crew could install a protective wrap around the connectors. This slowed down the process and as a result sleeves with Velcro straps have been ordered from the boom manufacturer.

3. IN-STREAM ANCHORS

Presently, WCSS have four main types of in stream anchors; Danforth, SARCA, Rake, and Disk anchors. As there have been anchor failures in the past, some changes were made to a rake anchor as well as a SARCA anchor. The objective of this testing was:

1. Identify the effectiveness of the revised rake anchors and SARCA anchors. Identify what other anchor options may be available. Testing should be done in areas where anchors have failed in the past (i.e. under the bridge in Devon) and in an area where visual observations can be made.

One of our existing steel anchors was cut in half, and rewelded with a point at the front, and wings that swept back about 10 degrees. Previous testing with these anchors indicated that, with a straight blade, material wouldn't build up behind the blade, but will wing off to the sides. This new anchor allows for more buildup of debris and therefore gives more opportunity for the anchor to hold.

Although this anchor will not work in every situation, it is apparent that the new configuration is an upgrade. We then built a similar rake anchor out of Aluminum in order to make it lighter and easier to retrieve. Testing on this anchor indicated that, although it was much lighter and could be retrieved by one person off the front of the boat, it was not heavy enough to dig into the river bottom, and therefore would set. We are now looking at ways of adding weights that could be removed from the anchor prior to retrieval.



