

November/December • 1996

# EROSION CONTROL

— THE JOURNAL FOR EROSION & SEDIMENT CONTROL PROFESSIONALS —



**EMERGENCY**  
**Erosion Control**

*Restoring Wetlands*  
*Grass-Lined Channels*  
*Landfill EC Methods*

OFFICIAL JOURNAL OF THE INTERNATIONAL EROSION CONTROL ASSOCIATION

## Erosion Control Magazine

OFFICIAL JOURNAL OF THE INTERNATIONAL EROSION CONTROL ASSOCIATION

*Emergency Erosion Control in the Queen Charlottes Everyone knows the amazing capabilities of helicopters, but with flight time pushing \$1,000 per hour and a target area 50 miles from the nearest airfield, how do you make it pay?*

Five hundred mountainous acres in the Queen Charlotte Island off British Columbia's northern coast were in need of reclamation seeding. Erosion was spreading by the day, the year's weather window was



closing fast, so time was running out if meaningful erosion control was to be performed before winter set in. The client, Western Forest Products Ltd. (WFP) in conjunction with Forestry renewal BC (FRBC) was champing at the bit, but there was one crucial problem... how to get at the area?

Even if you could find some way to bring equipment, materials and operating crews into the area, what then? The terrain is wicked. Besides, the combination of slope, slope length, surface roughness, soils and exposure to the elements eliminated all but a few potential solutions.

The client as well as the project overseer, Ken Hall, WFP's watershed restoration planner, could be persuaded that hydroseeding was the best (if seemingly impractical) solution. But even beyond the concern over cost there was skepticism that the task could be adequately completed regardless of price. John Dawson at Pacific Erosion Control Systems Ltd. (PECS) in Courtenay, BC thought he knew better, but more than that, he had a plan as well as the equipment and procedures to carry it out.

The Queen Charlotte job involved terrain that was logged more than 20 years prior. The logging camp had long since been removed so that any remaining roads were in a bad state of repair. Bridges were washed out and culverts were clogged up. "It was a

total mess" says Dawson. "There were close to 500 acres of landslides on Talunkwan Island alone, as it turned out" The big question facing all the bidders was how to get at the critical areas and perform critical erosion control measures.

PECS won the contract in April 1996, not because theirs was the low bid, but because they were able to convince WFP and Hall that the plan was viable because of a highly innovative helicopter hydroseeding technology involving the use of a portable mixing component that could reduce helicopter time to a minimum and still cover the target.

The technique, developed for military helicopter operations is called "FARPing" from Forward Area Replenishment Point—a procedure that allows helicopters to stage and deploy from as close to the battle area as possible. In addition to the logistical advantages offered by the proposed program, PECS's plan included the use of a new mixing system and buckets designed to produce different spread patterns for optimum coverage under various conditions of topography and wind conditions.

The key to Dawson's approach was a 52-m (170-ft.) barge that could be used not only for transport but as a working platform for helicopters as well. Perfect for island work, the barge could be towed along the shoreline, making the operation totally self-contained. Not only did this strategy have economic advantages, it also avoided the additional impact that the land-based operations would have on previously undisturbed areas.



In Vancouver, Dawson supervised the loading of food, fuel, product and equipment before sending it north to Thurston Harbour on Talunkwan Island, a mountainous finger of land 10 km (6 mi) long and 5 km (3 mi.) across at its widest point. There, tug and barge rendezvoused with the project's 27 m (90 ft.) support, *Serena Joye*, skippered by Dawson. The ship, with accommodations for up to 10 (including hot showers and laundry facilities), acted as a floating dormitory and command-and-control centre.

"At that point," says Dawson, "with all of the elements on-scene, we were really ready to get on with the program." Since the *Serena Joye* was capable of positioning the barge as needed, "We released the tug and took control of the barge ourselves."

The helicopters— an A-Star 350B and a Bell Jet Ranger from Sunwest Helicopters in Qualicum on Vancouver Island- arrived the next day carrying the WFP staff as well as FRBC Monitor Russ Wong. Dawson sees the helicopters as quite different characters, illustrating the distinction as, "If the A-Star were stocking up for a party, it would shop at Save-On, bulk buying all the basics. The Jet Ranger on the other hand, would head for the deli and select more delicate fare."

Pilot Rockie Saliken puts it a little more professionally. "The A-Star with its 20 ft. long-line can be used on the wide-open areas, while the Jet Ranger with its 60 ft long-line is better suited for cleanup, and in the tighter, narrower spots. Effectively, the A-Star can hoist half-again as much as its smaller companion, though when it comes to delivering product, the difference is smaller.

With the helicopters and all hands aboard, the crews' first task was to check out all the equipment and product supplies, and then go over all the details of the job so that everyone involved would be certain of their duties when flight operations began the the next day. While delivery effectiveness and turnaround efficiency were part of the agenda, safety held top spot on the agenda.

The Talunkwan Island job called for only a light mulch- (44 lb./ac) added to 66 lb. of seed, 265 lb. of fertilizer and 44 lb. of tackifier, but other applications called for use of a bonded fibre matrix (BFM) requiring 100% coverage. "With a BFM, you're not looking at 8 buckets of mulch per hectare," says Dawson "but more like 150



buckets." Obviously, the object is to maintain the shortest turnaround time possible (from barge to target, return, replenish and head off again.)

Ninety seconds is optimal for a two-helicopter assault, since it involves the shortest stage lengths without any overlap at either end of the cycle... waiting for the other helo during its replenishment or product deliver activity. Cost-effectiveness diminishes as cycle time increases, so when the working area lies beyond 1 mile, or at an elevation differential of greater than 1500 ft, you're outside the 3-minute limit that Dawson considers the optimum economic window for helicopter operations.

While much of the responsiveness is based on the mobility of system components, the turnaround times are made possible by a loading system allowing product to be transferred into the heli-bucket in under 15 seconds - twice as fast as the conventional pumping technology. Since the system outputs product continuously, there's no need for the helicopter to set down in mid-cycle while awaiting a new batch.

### Getting the Show on the Road

D-day was greeted by the soft whine of the turbines spooling up to ground idle. After both pilots had engaged rotors and checked for proper control movement and instrument readings, they took to flight in the successive stages of lightening the load on the skids, lifting into a low hover to check controls, and finally transitioning from hover to forward flight through coordinated use of collective (up/down) and cyclic (forward, side and aft) pitch controls. Once in-flight checklists were complete, the day's operations began in earnest.



“We started slow to check for problems and iron out any kinks.” Brian Sallows, owner of Sunwest Helicopters, explains. “But quickly the routine took shape, so by the second day we were going at full-tilt.” In fact, things began to move so smoothly and quickly that some of the observers were openly skeptical of the operation as they watched the material going from the barge to the island at what seemed to be an impossibly high turnaround rate. “They even considered shutting us down to check to see whether we weren’t just throwing product away on just any old mountainside.” Saliken remembers with a laugh. Sallows recalls, “Everybody stood there in amazement. Nobody had ever seen anything like this before.” Even the government monitor had trouble keeping up with the pace, so he requested and got assistance to verify coverage.

“We were up and down like a couple of yo-yos, says Sallows, who adds that the speed of delivery depended a lot on the pace maintained by the men working the two mixers on the barge. “Brutal” is how he describes it. “You wouldn’t want to be in there with someone you didn’t know,” he insists, explaining the difficulty of working in such a tightly confined space. Two 45 foot helicopters working off a 170 ft. barge doesn’t leave a lot of room to spare.”

The A-Star worked on a one-hour fuel cycle, making in excess of thirty 125 gallon deliveries that “pretty much kept him hopping the whole time,” recalls Dawson. “Each pilot racked up 10 hours of air time per day, hot fueling (gassing up without shutting down) to get the maximum productivity out of the daylight hours.”

The barge was the perfect base of operations while it circumnavigated Talunkwan Island, but there

remained an inaccessible section of the island interior—an area that lay outside the 3-minute turn-time dictated by the budget—when PECS’s mobile mixing unit came into play.

Dawson explains that only last fall, his company started looking at a more efficient way of doing things. Previously, aerial hydroseeding was conducted using a 3,000 gal tanker truck positioned as close to a site as possible.

When the helicopter arrived with a long-line, the truck driver placed the hose in the bucket while the operator pumped in the product and sent the helicopter on its way. Not only was the transfer procedure slow and proximity to the target area by road anything but a sure thing, (as on Talunkwan Island where roads would have proved inadequate to the task), but the helos would have to go elsewhere for refueling while the tanker replenished its own stock of product. Clearly another solution was needed.

“We designed this system to be transportable by any helicopter with a 635-725 kg slingload capacity,” says Dawson. “This is where the A-Star really earns its pay, because its slingload capacity can take it.” The heart of the system is the mobile unit, each component of which can be hauled in the back of a pickup truck. The heaviest component weighs about 1400 lbs, “You drive it - or ship it- into the general area and then airlift as close as possible to the target where there’s a water source. The system is completely self-contained with all its pumps, hoses, engine and hydraulics ready for immediate operations.

Dawson selected a clearing beside a creek, close to the slide area for the forward base, so when it came time to shift bases of operation he had the helicopter lift the mixing system and materials to the new site. This was to be the first of several moves during the life of the contract. “With





the first flight into the new setup,” says Sallows, “we’d fly in a net-load of product to the water source. Next flight we’d take the diesel engine to run the hydraulics and power the mixing unit and water pump. On the third lift, we’d bring in the mixing tank, so by the time we got back with the applicator buckets - we’re only talking a 5 or 6

minute flight- the ground crew had everything up and operating, ready for us to begin work again.”

What’s it like to work in and out of trees in rough terrain with gusty wind conditions? “Like standing on your shoe laces and trying to walk,” says Saliken. “That’s because your power is limited when you’re flying fully loaded uphill.” After a pause he adds, “You’re in deep trouble if something goes wrong.”

“I can’t emphasize enough how important a part of the system the pilot is,” says Dawson. It takes a special breed to do the job well. “Not just any helicopter

pilot can fly up a mountainside fully loaded. If anything goes wrong, there’s no place to go.” Dawson emphasizes that getting the product on target required throwing the bucket on the long-line at slope factors of 80% to 100%.

Sunwest boss, Sallows, says that working with a bucket on a long-line among old growth trees that are 150 - 200 ft high is “like putting it down on a hallway in your house.” When you’ve established a routine, “You’re like a goalie who’s hot. You’re focused.”

With the Talunkwan Island portion completed, operations shifted back to the barge again, towing next to Big Goose and Little Goose and then on to Sewell Inlet. By then it had become apparent that the supply of product wouldn’t cover more than half the area needing seeding. This was not, however, the result of underbidding or below-expected product delivery.

The designated slide areas had enlarged since the mapping took place in 1993 and there were many new slides as well. What had once been estimated at 530 acres had swelled to more than 1,000 acres, whereupon the Ministry of Forests and WFP elected to increase the contract in order to finish the job properly. Towed to Moresby camp at Cumahewa Inlet, the barge received new product and aviation fuel, after which the project continued to completion... a matter of 17 days, overall.

EC