



# PATCHING OCEANFRONT SANDBAGS

## *A blueprint for success*

### Using Sandbags to Control Erosion

Along the ocean shoreline of North Carolina and some other states, large sandbags provide short-term erosion control. Unlike the small bags used to build emergency dikes to prevent river flooding, ocean sandbags are large, typically 3 feet wide, 2 feet tall and 10 feet long. The bags must be heavy enough to prevent their movement by storm waves. When filled with sand, the bags weigh several tons. They can be stacked to build sloping revetments similar in design to stone revetments, or seawalls.

In North Carolina, most sandbags are filled with beach sand. Four- to 6-inch water pumps (called either small dredge pumps or trash pumps) are used to move a mixture of sand and water into the bags. The porous fabric allows water to flow through the bags but retains the sand. An operator manipulates the intake hose at the edge of the surf zone to maintain a proper slurry of sand and water. To be efficiently filled, the bag must have proper porosity. If it is too watertight, the back pressure of the



inflated sandbag will prevent filling. If it is too porous, the water will escape too fast to carry sand to the far end of the sandbag.

Bags are commonly made from woven fabrics similar to the filter fabrics that retain soil behind bulkheads and under stone revetments. Polypropylene or polyester fabrics are often used. Sunlight and ultraviolet radiation can cause many fabrics to deteriorate rapidly. To increase durability, textile manufacturers blend carbon black or other UV inhibitors into fibers prior to weaving. Polyesters can be coated with PVC and other UV inhibitors either before or after weaving. Left uncovered in the sun, ordinary fabrics may last five to 10 years. More sunlight-resistant fabrics may be special-ordered.

### Punctures by Floating Debris

One of the biggest threats to the durability of ocean sandbags is floating debris transported along the beach by storm waves.

Even minor storms can wash out dune walkways, steps to the beach and larger structures.



This wood debris is carried along the shoreline by breaking waves and longshore currents. Large debris will puncture most sandbag fabrics. The holes made are usually small, one or two inches in length, but the damage that results can be great. When a damaged bag is hit by a wave, water flows through the porous fabric and saturates the sand inside the bag. Once saturated, the sand will flow through the easiest outlet, even a small hole. One puncture will eventually collapse an entire sandbag.

In the past, patching sand-filled bags has been difficult. Machine or hand stitching in the field has proven impractical or ineffective. A single puncture could doom the costly bags. But a new repair technique using adhesives offers a more practical solution.

### Patching with Adhesives: A New Method

Based on use of adhesives in Florida, Sea Grant conducted limited field and laboratory tests of a new adhesive patching method to repair sandbags. The tests indicate that the method is superior to conventional repair practices and easily used to fix small tears. To salvage ocean sandbags, **marine adhesive sealants** can be used to apply fabric patches over small holes and tears.

Boatbuilders use marine adhesive sealants to glue together components and to form watertight seals. The adhesives are intended for wet, harsh conditions. At least two brands of sealants are available at many boating outlets: 3M's 5200 and Sikaflex

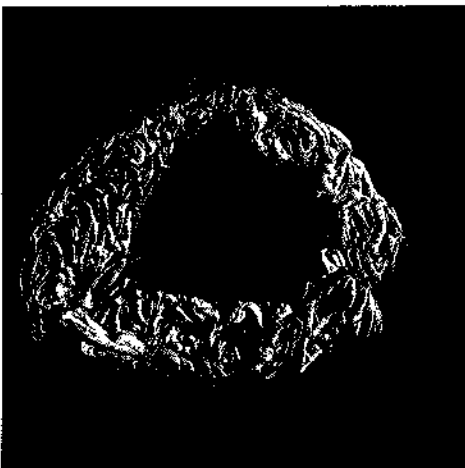
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241.\* Most other boat and building construction sealants lack the adhesive strength and flexibility to adequately patch sandbags.



Holes that are only a few inches in size are the best candidates for a patch job.



In preparation for patching, marine adhesive sealant is applied to the sandbag around the edge of the hole.



A round or oval patch about 3 inches wider than the size of the hole is applied with sealant.

## Repairing A Puncture

- Before patching, allow the sand beneath the tear to dry. If possible, wait for a time when the bags won't be reached by waves for several days. Drier conditions allow better curing of the adhesive.

- Cut a patch of fabric from a destroyed sandbag or a piece of woven filter fabric of similar strength. Size the patch to fit at least 3 inches around each edge of the tear. Circular and oval patches work better than square ones.

- Brush or blow any loose sand away from the puncture. Outline the patch location on the sandbag with a marker.

- Read the adhesive manufacturer's written recommendations and cautions. Apply

a generous coating of marine adhesive sealant to the bag and cover with the patch. With a rag or stick, work the adhesive through the pores of the bag and patch. Seal the edges of the patch to reduce the chance of it being lifted by a wave. Allow the patch to cure.

You'll get the best results with patches placed over small punctures, less than 3 inches across. It's also important to patch the hole soon after the damage and before the bag has lost much sand. It's difficult to fix tears longer than 1 foot or to repair major deflations of the sandbag.

## Preventing Sandbag Punctures

To prevent damage to sandbags, specify stronger fabrics when purchasing the bags. Typical fabrics used to make the bags have tensile strengths of 300 to 500 pounds. Sandbags don't comprise a large market for the manufacturers and are usually fabricated in small custom orders. Many stronger filter fabrics are available off-the-shelf to the manufacturer. Stronger fabrics have coarser weaves and may be too porous to fill easily by using a sand/water slurry. But the stronger fabrics can be effectively used as an armor layer over a lighter fabric with the proper porosity. The better materials will cost more but will be significantly more resistant to punctures and ultraviolet damage.

To avoid punctures during initial installation, remove all debris from under or near the sandbags. Wood or concrete debris from buildings, seawalls or other sources can cause punctures as the bags settle or shift from waves.

## Other Resources

- For more information on regulations and permits to control oceanfront erosion with sandbags, call the community's local permit officer or building inspector. Or call the N.C. Division of Coastal Management.

- For technical information on sandbag materials and sandbag revetment design, write Spencer Rogers, N.C. Sea Grant, 2201 Fort Fisher Blvd., S., Box 3, Kure Beach, NC 28449, or call 910/458-5780.

- For assistance in South Carolina, write the South Carolina Sea Grant Consortium, 287 Meeting St., Charleston, SC 29401, or call 803/727-2078.

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— Written by Spencer Rogers

\*Products named in this publication do not imply official endorsement. Other comparable products may be available.

