Recovery, Reuse, and Recycling of Debris From the Demolition of the Grace and Pearman Bridges at Charleston, South Carolina

Fred Cooper, P.E.
Earth Tech AECOM
Work started with removal of the Grace off-ramp between King and Meeting Streets.
Ken Canty pointing out that supporting columns are numbered to ensure removal in the correct order.
Debris being separated for reuse and recycling
Special recognition is given to Mr. Frank Starmer who is responsible for most of the spectacular deconstruction photographs in this presentation. The photos are used with Mr. Starmer’s permission.

http://oldcooperriverbridge.org/
Recovered rebar being separated, and bunched.
...and ‘gently’ working the girder down..
...to the ground. Awesome!
FACT

Earth Tech AECOM

Designed reconnection of city streets and I-26 / US 17 interchange improvements,

Managed prime contractor’s compliance with Joint State and Federal environmental permit for temporary impacts to wetlands,

Designed the ‘created wetlands’ at Waterfront Park in Mount Pleasant.
Removing the roadway from the Pearman, leaving only the steel skeleton near SPA.
Grace’s steel span. Bare steel of this nature can be easily recycled by the steel industry.
NOW THAT’S A CLAW!
BIGGER IS BETTER, AND THESE GUYS KNOW HOW TO USE IT.
Taking a safety break, …because a thunderstorm can be a shocking experience.
The final layer of roadway is ‘finally’ removed, and now...
On to the Reinforced Concrete Piers, the “Breakfast of Champions”
Hammering out boxed girders
A ‘Graceful’ Decent to Drum Island
SURREAL STONEHENGE?
From Surreal to Surgical…
Careful ‘Reverse Construction’ Over State Ports
Inland Area Cleanup…State Ports Authority, Town Creek, Drum Island, and the Ravenel Bridge in the Distance, and...
‘About Those Piers’…

The contractor must demonstrate that all parts of the Bridges have been removed down to or below elevations required, and that the waterways have been cleared to the satisfaction of Charleston District US Army Corps of Engineers (USACE) Commander.

Q: How are we to satisfactorily document removal of piers and miscellaneous debris in the Cooper River?

A: Provide Hydrographic Surveys of debris field including:

1. Bathometric contour mapping,
2. Side scan sonar survey, and
Topographic Map - Cooper River Bottom
West of Shipping Channel
Topographic Map - Cooper River Bottom
Town Creek
Magnetic Intensity Map - Cooper River Bottom
West of Shipping Channel
Magnetic Intensity Map - Cooper River Bottom
East of Shipping Channel
The Mighty Jay Cashman Sails
to recover the remaining demolition debris
from the floor of the Cooper River
Debris…
And more debris… Photographs document the work…about 102 debris removal photos.
PROJECT RECORDS

240,292 tons of reinforced concrete placed in 12 off shore artificial reefs,

5,286 tons of debris used to create new artificial reef adjacent to a new observation pier at Mount Pleasant, and

24,668 tons of structural steel was recycled,

TOTAL = 270,246 tons Vs. 261,000 tons bid.
A girder is being removed here over East Bay Street at night.
Note Claw at Right. This girder is being divided into smaller segments for easier transportation.
On Board the reef crew’s boat, ‘Jay Michael’. 
View from the Jay Michael heading out to the designated reef, and passing material being loaded onto a barge for another reef site.
Course tracking with a small GPS to document our consistent outbound and inbound routes.
About an hour later - our reef destination – with Brad's 345 and Rick's 750 positioned on the barge at the site.
As we approach, we can see that twin “jaws” are in sleep-mode.
Rick and Brad awaken their machines, …the “jaws” stretch out, as if to yawn, “good morning”, and then the action starts…
King of the Hill!
Jaws ‘gently’ snaps up a reef segment...
...and gently tosses it...
Placing the reinforced concrete debris at the reef site.
(These guys make it look easy, and fun.)
SPLASH!
It takes two for the big tango...
Gittin’ Busy!
Another surreal scene, “ravenous jaws and claws toss parts from large civil structures into the ocean”. (Kinda-like old school Sci-Fi!)
After finishing up: first a short conversation and then…
...a little R&R as the Jay Michael heads home.
Nearing port and passing by a sailboat... while the sun sets...a picture made to order.
The sun says, “good evening”... we are home.
ARTIFICIAL REEF CONSTRUCTION PROJECT

Largest reef construction project in South Carolina’s history based on tonnage.

Largest number of deployments (50), and

Enhanced the largest number of reef sites of any project in South Carolina’s history.
DNR Photo: Reef Fish and Invertebrates find a home in our recovered concrete and rebar debris.
Another DNR Photo: Our Recovered Concrete and Rebar make a good home for marine life. A good homes makes for happy fish, and that makes us happy too~!
**FACT**

**SIMULTANEOUS DE-CONSTRUCTION OF THE GRACE AND PEARMAN BRIDGES**

Bid for design and deconstruction included 261,000 tons of reinforced concrete and structural steel to be recovered and reused or recycled.

Successfully completed by Jay Cashman, Inc. /Testa Corp., A Joint Venture (the Joint Venture), and their subcontractors, one being Earth Tech AECOM.

Demonstrated that recovery, reuse, and recycling of demolition debris can reduce costs and benefit the environment.