CASE HISTORY
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FALLS RD GABION RETAINING WALL
BALTIMORE, MD

HYDRAULIC WORKS
Product: Double-Twist, Wire Mesh Gabions

As far back as the early 1970’s Maccaferri has had an impact on shaping the landscape of the greater Washington, D.C. and Baltimore, MD area. This case study takes a look back at a retaining wall project, completed in 1974 in Baltimore, that is still standing strong today, providing evidence for Maccaferri’s knowledge and experience in hydraulic applications. We’ve included updated photos from Summer 2017 and look forward to future studies, analyzing the zinc properties and residual effects on the PVC coatings.

Problem
In June 1972, Tropical Storm Agnes came ashore along the Florida Panhandle. As it moved slowly up the eastern United States it gained strength to become a Category 1 hurricane. The 1000 mile wide depression stalled over eastern Pennsylvania. The extreme rainfall quickly caused peak watercourse discharges in excess of 100 year events, which has still not been exceeded even in 2017. Water run-off was amplified as the ground had already been saturated by rain in the weeks before the hurricane.

Client:
CITY OF BALTIMORE

Main Contractor:
GABION CONSTRUCTION INC., MD

Designer:
CITY OF BALTIMORE

Products used:
GABIONS

Date of Construction:
JULY - SEPTEMBER 1974

Before Construction in 1974, looking North

After Construction in 1974, looking North

Project photo from 1985, 11 years later, looking North
Falls Road in Baltimore, MD runs parallel to I-83, known as Jones Falls Expressway. In one location, Falls Road had been washed-out by the swollen river flowing adjacent to it. A robust, economic and free-draining retaining structure was required to reinstate the highway, and protect it for the future. The structure would also have to direct the river around a curve.

**Solution**

City of Baltimore engineers and Maccaferri Inc, designed a gabion retaining structure with a maximum height of 27ft. Maccaferri Double Twisted Wire Mesh gabion baskets form permeable, monolithic and flexible structures. The woven mesh allows these gabions to accommodate large differential settlements without rupturing or unzipping. Although the gabion wall could accept these large settlements, the highway above could not. Therefore the gabion wall was designed with a 3ft thick mass concrete foundation.

As the wall was to be in close proximity to the water course, PVC coated gabion units were specified (In 1974, the PVC offered by Maccaferri Inc was black in color). Specialist gabion installation contractor Gabion Construction Inc., began installation by diverting the river to construct the concrete foundation. This project also saw the use of early geotextiles placed behind the gabion structure, similar to Maccaferri’s MacTex. The woven polypropylene textile was used to limit wash out of fine material from behind the gabion wall.

Installation of the gabions proceeded at an average rate of 16 CUY per man per day.

Road way drain pipes were punched through the face of the gabion wall to outfall into the watercourse. The woven gabions were easily shaped on-site to accommodate these pipes.

Gabion units were installed as an anti-scour ‘apron’ at the toe of the retaining wall to prevent erosion undermining the wall.

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In 2004, 30 years later, Maccaferri revisited the gabion retaining wall. Samples of the PVC coated mesh were taken. Laboratory tests were carried out on the zinc coating left on the steel under the PVC, and the residual properties of the PVC after 30 years of UV and abrasion exposure.

The results were excellent. Only 35% of the initial properties of the PVC had been lost, and the amount of zinc remaining was still superior to the minimum requirement of the project specification. By comparing the 35% loss in PVC properties to recent reference results from accelerated heat aging laboratory tests, the structure has a life expectancy of around 60 years. (See Maccaferri TECHNICAL NOTE – GABION DURABILITY for more detailed information.)