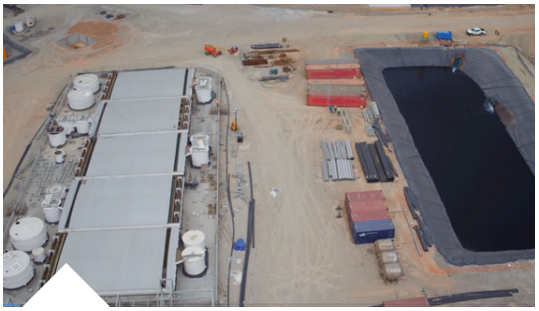
Case History

Copper Mine on Wetar Island, Indonesia

Market Segment:	Corrosion, Mining
Composite Application:	Tanks
Resin:	Vipel® F013
Manufacturing Process:	Closed Mold, Hand Lay-Up, and Filament Winding
Specifications:	2,000-gallon tub (19' x 7.5' x 4.33')
Chemical Exposure:	Sulfuric Acid
Installed:	2015
Location:	Wetar Island, Indonesia



Production facility during the assembly phase

A copper mine on Wetar Island is the first of its kind in Indonesia to yield a value-added product, LME Grade A copper cathode. The mine is expected to produce 1.65 million tonnes per annum (MTPA) sulphide ore and 25 kilotons per annum (KTPA) copper cathode.

Due to their corrosion-resistant qualities, fiber reinforced plastics (FRP) tanks were used throughout the project. The FRP tanks were fabricated by Graha Adhi Jaya Abadi (GAJA) using AOC's Vipel F013 Bisphenol-A Epoxy VE resin purchased through PT. Global Raya Chemicals, a distributor of AOC resins in Indonesia.

Building the Mine Site

Building this new mine started 1,400 miles away at a former plant located in Western Australia. Materials and equipment from Australia were disassembled and then needed to be reassembled at the Wetar Island mine.

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The first challenge was to get the proper equipment and raw materials to the remote site, located on the north central coast of Wetar Island. The location necessitated everything be brought in by boat then transported to the site. Once in place, the reassembly of the production plant began. Moreover, the size of the working area dictated a precise timeline to ensure the right equipment and materials arrived just when they were needed.

This site did benefit from having some existing infrastructure in place from prior use as a gold mining facility. Existing infrastructure included a landing wharf, camp, roads and partially exposed copper ore bodies.

Planning for Corrosion Resistance

Once in operation, the ore would be extracted from the ground and moved to the smelter where it was broken down to remove impurities and arrive at the desired copper base.

During the smelting process the FRP tanks are filled with highly corrosive H2SO4 70% (sulfuric acid) and they needed to be protected with a corrosion-resistant resin. The GAJA team was familiar with AOC's corrosion resistant resins and found exactly what they needed in AOC's Vipel F013.

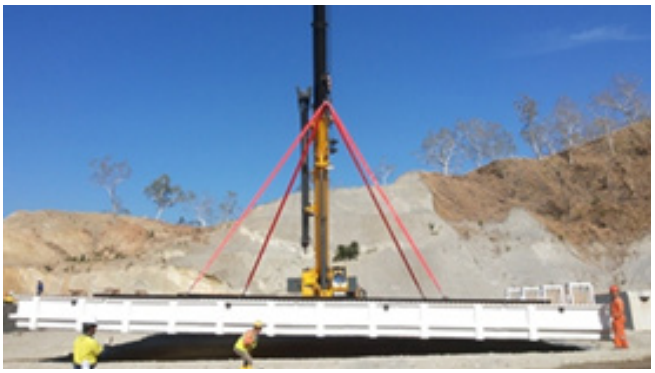
Vipel F013 series are bisphenol A epoxy-based vinyl ester resins. The resins provide wide range of corrosion resistance capabilities making it the perfect fit for the mining project.

FRP Tank Production

GAJA produced all FRP tanks for use throughout the project. With some parts being produced off-site and transferred to Wetar Island, and some being created on-site, tank production took approximately six months.

Through a closed mold application, the GAJA team manufactured the rectangular settling tank and had it shipped to the site. When it arrived, they fit together eight pieces to form a tank measuring 18 m (L) x 12 m (W) x 1 m (H).

Fabrication of a buffer tank measuring 12 m x 5 m (H) and three storage tanks sized 5 m (D) x 5 m (H) took place on-site. A hand lay-up process was used to



Rectangular Settling Tank

produce the buffering tank, while a filament winding process was used to create the storage tanks.

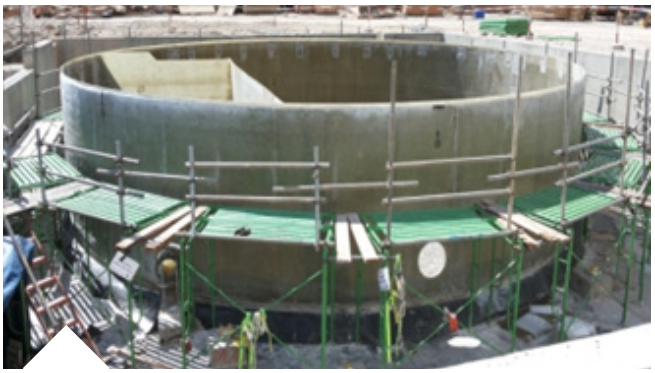
During tank production, AOC assisted with the laminate construction. AOC also provided a recommendation letter guaranteeing that the resin was properly formulated to meet the customer's expectation.

About GAJAFIBERGLASS

With headquarters in Jakarta, Indonesia, PT. Graha Adhi Jaya Abadi FRP Engineering & Manufacturing, or GAJAFIBERGLASS, has been making engineered fiber-reinforced composites to world-class standards since 1990. End-use application expertise includes tanks, linings, coatings, pipes, fittings, roofs and gutters. For more information, e-mail marketing@gajafiberglass.com or go to www.gajafiberglass.com.

About AOC

AOC is the leading global supplier of specialty resins and materials utilized in a wide range of applications including Coatings and Protective Barriers, Colorants and Visual Effects, Adhesives and Specialties, and Composite resins. For more information on AOC technology, quality and service, e-mail americas@aocresins.com, phone (866) 319-8827, or go to aocresins.com.



Buffering Tank

Storage Tank

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