



## CASE STUDY

# OK Tedi In-Pit Crusher Upgrade

Star Mountains, Western  
Province, Papua New Guinea

Reinforced Earth Walls  
TerraMet®

Owner: Ok Tedi Mining  
Limited

Consultants: Worley Parsons

Contractor: Star West

Construction: November 2005

### Background

The Ok Tedi mine in Papua New Guinea has been operating for over 25 years producing Copper, Gold and limited amounts of other metals.

### Challenge

With the phasing out of the Taranaki crusher (in order to mine the ground underneath it), the importance of the In-Pit crusher would increase. However, the In-Pit crusher was inefficient in its current state and therefore alterations and additions were necessary to give it additional capacity to cope with the increased production.

The alterations included the construction of additional dump walls, which allowed for the installation of a secondary screening plant. By screening off the fine material and sending it further up the line, the In-Pit crusher would then be able to handle more coarse material.

Design, supply and construction challenges particular to this project were:

- Extremely wet conditions due to an annual rainfall greater than 10m each year.
- Acidic ground water conditions.
- Extremely remote site. Access is either by air, or by boat up the Fly River, to Kiunga,

followed by 150km dirt track, through the Tabubil Township, into the Star Mountains to the mine.

- Inexperienced, low skilled, native speaking, manual labour.

### Solution

As part of the In-Pit Crusher upgrade, The Reinforced Earth Company (RECO) was awarded the design and supply of over almost 1800m<sup>2</sup> of TerraMet® retaining wall. RECO was further awarded the design and supply of almost 500m<sup>2</sup> of additional TerraMet® walls for the adjoining haul road accessing the In-Pit crusher. A number of new, smaller TerraMet® walls were added once the design had commenced.

TerraMet® was chosen as the perfect solution for the remote site as it is easily transportable and could be freighted to site in shipping containers.

The Reinforced Earth (RE) wall design had to accommodate foundations comprising uncontrolled fill, together with high seismic loading appropriate in this region. RECO's design team used their experience from the Freeport mine in Irian Jaya, Indonesia, which has similar geological conditions and acid generating fill, to guard against potential corrosion of the REhas® strips. The design



Main Picture: Construction of TerraMet® dump structure begins. Note panels and strips stockpiled on site, and grader and bulldozer spreading and compacting backfill, respectively.

Top: Mine vehicle on top of structure. Above: Spreading select fill on top of REhas® reinforcing strips.

Mining infrastructure



**REINFORCED EARTH**  
SUSTAINABLE TECHNOLOGY



Main picture: RECO site supervisor, Geoff Slavin with Starwest construction team.

Above: Hand compacting backfill near face of structure.

incorporated a HDPE membrane and a substantial drainage layer to seal the RE block and keep out any contaminated water.

The RECO design team needed to accommodate a number of late design revisions and geometry changes within the scope of works, even after some of the materials had left Australia.

RECO was also responsible for the drainage design, a major and very important component of the design due to both the high annual rainfall, and the corrosive contaminated groundwater.

#### Special features/benefits

- Despite all the design challenges, RECO's design still allowed for continued use of one side of the existing crusher, ensuring that productivity at the mine site was not disrupted.
- An HDPE membrane and a substantial drainage layer were used to seal the RE block and keep out contaminated water, the consequence of high rainfall and acidic groundwater conditions.

- Due to the remote site location and need for an easily transportable product, TerraMet® was chosen as the perfect solution. All materials were packed into shipping containers and freighted to site. They were first sea freighted from Newcastle to Kiunga, then road freighted along 150km of dirt road into the Star Mountains to the mine site.
- RECO provided full time onsite supervision for the entire construction of the RE walls, which was done using Star West labour and machinery.
- Construction took four months, slightly longer than anticipated. Construction was slower due to wet conditions and inexperienced labour. However the local labour showed a willingness to learn and coped well with the new tasks. Once given instruction, the local workers were diligent in their work, despite the difficult working and living conditions.

#### Project specifications

<b>System</b>	TerraMet®
<b>Finish</b>	Galvanised
<b>Structure</b>	Dump Structure
<b>Area</b>	1736m <sup>2</sup>
<b>Max. Height</b>	16.75m
<b>Length</b>	135m
<b>Design load</b>	CAT 789C (GVW = 318T)
<b>Design life</b>	15 years