



Case Study

## **New Technology for a ‘new’ Mine – A sustainable, innovative Partnership for reactivating a Philipino Copper Mine**

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In 2007 a Philipino copper mine was reactivated after half a decade of decommissioning. To improve the technical and financial results the mining company engaged a specialist company for the upgrade and expansion of the concentrator plant, the capacity of which grew by 50%.



Outotec upgrade at the Carmen Copper site. (Pictures: © Outotec)

Carmen Copper (“Carmen Copper”), a wholly-owned subsidiary of Atlas Consolidated Mining and Development (“Atlas Mining”), practices sustainable and responsible mining by adhering to the highest standards in health, safety and environmental performance in its operations and by leading the industry in

community contributions and relations.

Sustainability and operational excellence form the cornerstones of Carmen Copper's mining enterprise. It is currently working towards achieving higher cost efficiency and being in the lowest quartile of mining companies worldwide in terms of production costs.

Carmen Copper resumed the operation of Atlas Mining's Toledo copper mine by facilitating its rehabilitation in 2007. Operation of the Toledo mine (located in the Cebu-province in the Philippines) began in 1955, but was suspended in 1994 on account of flooding and the decline in the world market price of copper.

## **Scope**



Overview of the Carmen processing plant.

In 2012, Carmen Copper engaged Outotec as its principal technology partner for the upgrade and modernisation of its processing plant. Upon completion of the first phase of the upgrade project, daily throughput is expected to increase from 40 000 tonnes per day to 60 000 tonnes per day.

Outotec, a Finland based manufacturer renowned for innovative solutions and technology, was engaged on an EPS basis (Engineering, Procurement and Services). Alongside full engineering expertise, including high level concentrator process capabilities, Outotec's proprietary minerals processing equipment would also be a key component in delivering the targeted expansion of Carmen Copper's processing capacity.

The delivery schedule was extremely ambitious, with Carmen Copper and Outotec working in close partnership toward completion.

## **Innovative Engineering**



The scope of the project for Outotec also included two 6 MW ball mills.

Outotec's engineering approach engaged a multi-disciplinary team of technical personnel for civil, mechanical works, engineering design, instrumentation and process engineering. The team worked well with the Filipino engineers of Carmen Copper to meet demanding schedules.

The upgrade was engineered for both greenfield and brownfield stages to allow continuous plant operation. Allowances were also incorporated for future expansion and sustainable, value-adding by-product recovery.

Point Cloud 3D laser scanning was employed to provide a complete and accurate survey of the vast site. This technology, from a detailed engineering perspective, not only delivered the fastest and safest means of surveying this complex brownfield plant, but is also the most accurate in the world, providing a complete up-to-date picture of site. The extremely precise 3D scanned data considerably reduced time associated with processing data and images in more 'traditional' ways.

## **Partnership Approach**

The close partnership between Carmen Copper and Outotec ensured meticulous planning and enabled site to be fully operational at all times. Tie-in points for new equipment and rerouting of pipework, for example, were planned upfront and all disruptive work was completed during shutdowns, ensuring no interruption to production. Procurement was also carried out on a collaborative basis with Carmen Copper to deliver the most cost effective and timely result.

## **State-of-the-art Technology**



The Outotec 39 m tailings thickener replaces capacity of up to 5 x 77 m conventional thickeners.

Designed to cope with projected increases in throughput and recovery, Outotec's new concentrator technologies at site comprise comminution, flotation, thickening, analyser and DCS systems. Considerably more operator friendly, the upgraded circuit offers easier and safer access. The new system delivers advanced analysis and automation for up-to-the-minute process stability, and is aimed at providing maximum availability and optimised recovery. Commissioning of the upgrade was due to commence in the fourth quarter of 2013.

## **Future Development**

The Carmen Copper expansion project has afforded Outotec a unique opportunity to work closely on a significant brownfield concentrator expansion project. This project required very close on-site liaison with the client, who has been responsible for construction. Through collaboration, Filipino subcontractors and partners were utilised for detailed engineering and the Carmen Copper project as a whole has facilitated development of concentrator engineering, procurement and project management. With forward planning, Carmen Copper has the flexibility to undertake further expansions in the future.

## **Project Scope:**

- EPS (Engineering with collaborative Procurement and Services).
- Proprietary equipment supply

## **Details-EPS:**

- Engineering study
- Process engineering
- Detailed civil, structural, mechanical and electrical engineering
- Procurement - collaborative scope.
- Mill, civils and site installation advisory services
- On site engineering support services (mechanical, structural, civil & electrical)

## **Details-Equipment:**

- 2 x 6 MW ball mills and trommels.
- Complete float circuit (roughers and high-grade cleaners) incl. 4 x 300 m<sup>3</sup>, 10 x 16 m<sup>3</sup> cells and blowers

- New 39 m tailings thickener (tank, bridge, feed, mechanism)
- Retrofit upgrade to 2 x 24 m concentrate thickeners
- Courier analyser, PSI and metallurgical sampling system
- DCS System