

Commodity
Copper

Technology
In-Pit Primary Crushing Station

Application
In-Pit Crushing and Conveying (IPCC)

Study type
Case Study

Country
Kazakhstan

How in-pit crushing and conveying cuts costs and emissions at a large copper mine in Kazakhstan

Switching to an in-pit crushing and conveying (IPCC) system at a copper mine in Kazakhstan will reduce diesel consumption by 93% compared to the current truck-based haulage. This will reduce the mine's Scope 1 CO₂e emissions by 73%, while also cutting mining costs by 15%.

Long-term trends in surface mining pose a challenge for mining companies seeking to reduce emissions. Mines are getting deeper and recovering lower grades than in the past. This means more material must be transported over longer distances, with slower cycle times, to maintain production levels. The size of truck fleets will therefore have to increase; personnel numbers and fuel consumption will also rise as a consequence.

These factors will naturally lead to an increase in both OPEX and CO₂e emissions. In this environment, IPCC is gaining attention as a proven solution to these challenges.

The advantages of IPCC were recently enumerated for a copper mine in Kazakhstan with annual production capacity of about 40 million tonnes. With average transport distances of 0.75 km and a pit depth of 670 m, this truck-and-shovel operation currently consumes 50.66 million litres of diesel per year. We determined that, by switching to an IPCC system, the mine would gain significant financial and environment benefits.

To achieve required capacity, an 8,000 tph primary crushing station is planned. Its modular relocatable design will significantly reduce diesel haulage, resulting in a 93% drop in annual diesel consumption to just 3.7 million litres. And although the use of conveyor belts increases electricity consumption, annual CO₂e emissions will still fall by about 99,500 tonnes compared to diesel-powered haulage: a 73% reduction.

The move to IPCC therefore offers reduced costs, estimated to be 15% lower than current truck-based mining practices, as well as a dramatically greener mining footprint.



73%

Reduction in
CO₂e



99,500 t

Reduction in
CO₂e



93%

Reduction in
fuel consumption



47 ML

Reduction in
fuel consumption



15%

Reduction in
cost of mining

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