Guizhou Kailin

John Chadwick reports on expanding trackless operations at the sublevel open stoping mines of China's leading phosphate producer from a recent visit to the southwest of the country

Guizhou Kailin Mining Corp runs one of the three largest phosphate mining complexes in China, producing the richest ore. It is a high-grade operation exploiting six underground mines around the town of Jinzhong, which sits at an elevation of 820 m above sea level in Kaiyang County, Guizhou Province. The average grade of Kailin's product is 32.5% P_2O_5 and Kailin's resources around Jinzhong account for 78% of China's known phosphate resources of this high grade. The mined product is such that no processing plant is required. The ore is directly fed to the company's fertilizer plant by a 17-km pipeline.

Kailin currently produces 3 Mt/y of phosphate rock from the six Jinzhong mines, along with 1.5 Mt/y of rock from development, which annually totals 30,000 m. However, the company has embarked on an expansion to raise phosphate rock production to 5 Mt/y by the end of 2008. That year, Kailin will celebrate 50 years of continuous operation and its known resources will allow operations to continue for another 50 years. The mining area covers 85 km², being 17 km long by 5 km wide.

Maluping in the centre of Jinzhong town is currently the largest of the six mines of the area, producing some 20% of the annual 3 Mt of production. Once the company-wide expansion to 5 Mt/y is achieved, Maluping will be producing over 1 Mt/y. Another mine, Shabatu will at that time become the biggest of the group, producing 1.4 Mt/y. All six use the same mining method.

Kailin's existing plant produces 1.6 Mt/y of fertilizer. The mine expansion to 5 Mt/y will provide the feed to another 1.2 Mt/y plant that is being built, as well as allowing the company to continue selling product to other phosphate users.

The mine operates a variation of sublevel open stoping (SLOS) that was developed for it by Sofremines in the mid 1980s. Kailin was one of the early exponents of trackless mining in China, starting with three Tamrock jumbos, and other trackless mines around the country have taken ideas from here. Trackless mining is by no means the norm in China. While many of the country's larger mines do use trackless equipment, there are still very many mines in the country that do not. Kailin's SLOS with roof bolting mining method won a first class award of China National Scientific and Technical Innovation.

This particular variant of SLOS employed by Kailin was brought in to increase recovery. There are only two mines in China using this mining method, the other being a coal mine. Now the mine has also started some cut and