

## MINING INSIGHTS

# 10 Things You Should Know About Surface Miners



**Filip Orzechowski** CEng MIMMM MSc  
Senior Consultant (Mining Engineering)

In cooperation with:

**Dr. Ing. Erik Zimmerman**

Product Manager Mining at WIRTGEN GmbH



[Click here to go to our website](#)

“ If you are dealing with suitable material, trying to eliminate blasting and/or primary crushing, the surface miner can be the tool for you. It may also help to maintain roads and keep your open pit tidy. ”

*Photos are a courtesy of Wirtgen GmbH and Vermeer and all rights reserved.*

## Foreword

Mining like all businesses looks to optimise their production chain, reduce costs, and be more efficient. There are some particular aspects in mining related to the mineral resource, such as ore characteristics, access, surrounding infrastructure and the environment that require special consideration. Mining methods and technologies have developed over the years to meet the above objectives in these settings. This relatively new solution, designed to eliminate or reduce blasting and primary crushing and which can lower haulage costs, has application in a range of situations: below are the 10 things you should know about Surface Miners.

### 01 | Surface miners cut rock

Rock properties will determine applicability, performance and cost of using surface miners. The main values to be analyzed are unconfined compressive and tensile strengths, abrasivity, density and rock structure, although there are additional properties to measure for a more complete assessment. Each situation should be assessed to confirm suitability of the equipment. As a rule of thumb almost all kinds of sedimentary rock can be economically mined with a surface miner. However, there are limits for igneous and metamorphic rock. It must be clearly stated: not every deposit can be economically mined with surface miners.

### 02 | Unconfined compressive strength is key parameter

In general, any rock characterized with compressive strength of between 2 and 120 MPa is likely to be suitable for cutting with surface miners. Rocks with higher strengths would require more detailed study and should especially consider discontinuities, cracks and fractures in the rock structure.

### 03 | Productivity strongly depends on the cut material

Broadly saying, productivities vary from 100 to 2,500 bcm per hour and the material can be either left on the ground, side casted to a stockpile or even directly loaded onto trucks.

### 04 | No crushing required

It depends on your final product specification (grain size and form) but generally primary crushing is not required where surface miners are used. The size fraction of Run of Mine material is controlled by the setting of the rolling drum.

Figure 1: Direct Loading



Parameters include drum and machine working speeds, cutting depth and tool line spacing. Sometimes, the direction of mining relative to the pervasive direction of rock discontinuities will also have an influence.

### 05 | Stop blasting

Mining locations have different circumstances. Near homes and infrastructure excavation permits can require blasting to be restricted, or not permitted at all. If the material is suitable for cutting, a surface miner can be used. It can also reduce other adverse impacts like fumes, dust, noise and vibration.

### 06 | Vertical selectivity in mining is greatly increased

Using surface miners allows operators to cut material along contact zones with accuracy of just a few centimeters. It creates many opportunities reduce ore loss and minimise dilution improving ore quality more effective recovery of the mineral resource. In some cases, these factors will help determine the feasibility of a mining operation.

Figure 2: Windrowing



### 07 | Conveyor or not, there is some choice

Various types of surface miners are available, with or without a loading conveyor belt, which can be mounted at the front or back of the machine. This provides flexibility for loading and choice of haulage fleet. Side-casting and creating windrows gives opportunity for further quality assessment and operational control.

### 08 | Pit slope angles are maintained, and benches are tidy

Surface miners will cut to shape stable slopes and mining faces with a high precision. Any bench or berm configuration can be produced with surface miners. Building and profiling ramps and haul roads can be also very efficient. Surface miners are also used to maintain and rehabilitate pit floors, haul roads, create trenches, embankments and profiled surfaces, which can lead to substantial savings in the haulage operation better housekeeping, and subsequent reduction of risk.

### 09 | Reduced labour levels and installation costs

Surface miners are generally operated by one operator, and in those cases where they load and eliminate the need for blasting and crushing, labour levels are decreased. Where a surface miner allows drill and blasting activities to be reduced or eliminated capital and operating costs will be lower, and with a simplified production chain, associated operational challenges will be few.

### 10 | Drum Setting

Currently, there are two main equipment manufacturers of surface miners. The key differences in their designs is drum location and cutting direction. One design has the drum in the middle of the machine body and cuts upwards, and the other at the back of the machine can cut downwards. The first design is said to be able to apply larger loads on the drum resulting in higher cutting capacities while the second solution allows the machine to operate in very small areas.

## Contacts

If you would like further information contact:



### Filip Orzechowski

Tel: +44 (0) 2920 348 150  
Mobile: +44 (0) 7912 268 860  
Direct: +44 (0) 2920 348 195  
Email: [forzechowski@srk.co.uk](mailto:forzechowski@srk.co.uk)  
Skype: filiporzechowski



### Fraser McQueen

Tel: +44 (0) 2920 348 150  
Mobile: +44 (0) 7885 807522  
Direct: +44 2920 386 277  
Email: [fmcqueen@srk.co.uk](mailto:fmcqueen@srk.co.uk)  
Skype: fraser.wilson.mcqueen.srk



### Sarah Williams

Tel: +44 (0) 2920 348 150  
Mobile: +44 (0) 7809 338 839  
Direct: +44 (0) 2920 379 677  
Email: [sawilliams@srk.co.uk](mailto:sawilliams@srk.co.uk)  
Skype: sarah\_i\_williams



### Hanno Buys

Tel: +44 (0) 2920 348 150  
Mobile:  
Direct: +44 (0) 2920 379 674  
Email: [hbuys@srk.co.uk](mailto:hbuys@srk.co.uk)  
Skype:

For more information on our services and a complete directory of our offices, visit our website: