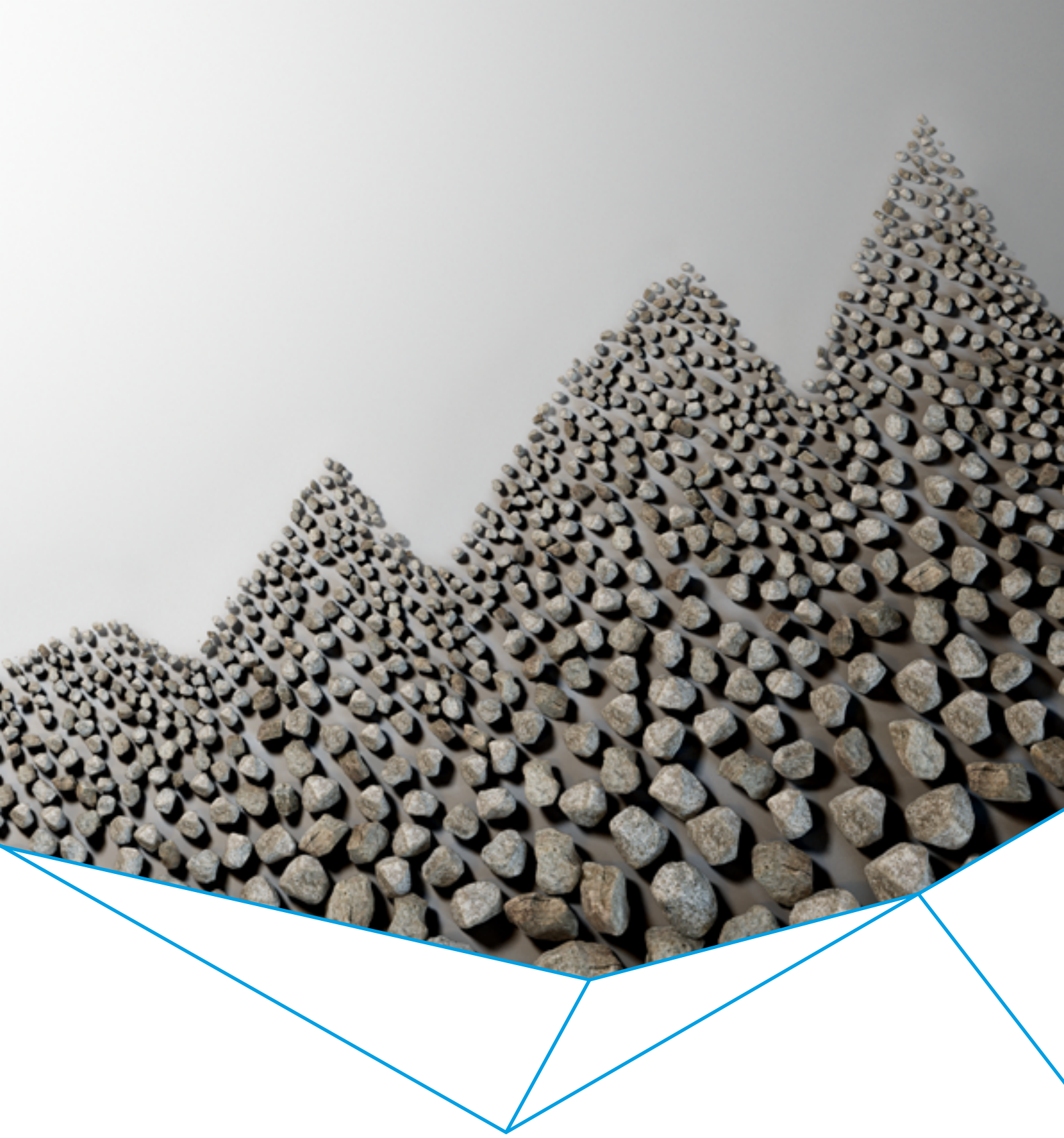

MASTER YOUR OUTPUT
SCREEN SELECTION AND OPTIMIZATION GUIDE

SANDVIK

OPTIMIZE SCREENS TO BOOST QUARRY ECONOMY

Understanding the big picture is vital in order to get the most out of your operation. Looking at the relationships between all steps in the overall process can make a big difference to your bottom line.

This is what optimized screening could mean for you:

- Reduced load on other processes, such as crushing
- Lower power consumption in crushers, conveyors and other equipment
- Less wear and more uptime for crushers, chutes and conveyors
- More of the most saleable fractions

SCREEN SELECTION

Consider these three key issues when selecting a screen:

1. Correct screen type
The type to use depends on the maximum feed size, and the required sizes and cleanness of products.

2. Correct width
The bed depth must be within certain limits on both the feed and discharge ends of the screen. This is determined by the feed capacity and particle size distribution.

3. Correct area
There must be sufficient area to allow particles to go through the deck. This is determined by the throughput capacity, particle size distribution and screening media selection.

THE MAIN SCREEN TYPES AND THEIR DUTIES

SCREEN TYPE	Maximum Feed Size (mm) [1]	Maximum Separation (mm) [1] Top Deck	Scalping before primary crusher	Scalping after primary crusher	Scalping after secondary crusher	Closed circuit screening	Mining Duties [2]	Final fractioning sep. 16-64	Final fractioning sep. 0-16
Grizzly SG	1500	250	B	P			B		
Grizzly SG...H	1200	250	B	P					
Circular SK	200	130		P	G	G	G	B	B
Circular SC	300	140		G	G	G	G	B	B
Linear LF	300	100		P	P	P	B	G	B
Circular MSO	300	140			G	G	G	B	B
Free-Fall SS...H	350	100	P	B	B	G	P		
Free-Fall SS	150	80			G	B		P	P
Free-Fall SF	120	64						G	B
Roller Screens SR	1200	160	G	G	G		G	G	G

Recommendations: Best (B), Good (G), Possible (P)

Note: Stars indicate a general level of suitability (i.e. the more stars the more suitable).

[1] These values correspond to material with bulk density 1,6 t/m3 and are recommended values only (i.e. other figures might occur in special applications/screen sizes).

[2] Mining duties, in terms of high-density ore as well as 24-hour operations and 365 days per year.

SELECTING SCREENS FOR KEY DUTIES

Scalping
Separation accuracy is not critical, but feed rates are normally high. Suitable machines for coarse scalping (separation > 100 mm) are a vibrating grizzly feeder/screen or an extra robust screen with bar or pin grizzlies, or heavy-duty rubber elements. Suitable machines for scalping of finer material (separation < 100 mm) are a compact free-fall screen or a conventional circular-motion screen with rubber elements.

Closed-circuit screening
Closed-circuit screening usually corresponds to high capacities and reasonable accuracy requirements. The separation size is normally between 16 and 100 mm. Suitable machines are a compact free-fall screen or a conventional circular-motion screen. Multiple decks are often used to reduce the bed thickness in applications with a large proportion of circulating material.

Final product screening
This duty is usually associated with strict product specifications, which demands a screen with good separation accuracy. Suitable machines for small separations (< 16 mm) are a linear/elliptical-motion screen, a free-fall screen, or in some cases a circular-motion screen. Wire or special synthetic elements should be used. When the requirements for separation accuracy are not too severe, or when the fractions are longer, a circular-motion screen can be selected. Plastic elements should be used for wet screening.

CALCULATING SCREENING AREA AND BED DEPTH DEMANDS CARE

This models below show the parameters you need to take into account in order to achieve good results.

Screen area

$$Q_{through} = A \times B \times C \times D \times E \times F \times G \times H \times I \times J \times K \times L$$

Q: Thoroughput capacity (t/h per m²)

Where:

A: Nominal capacity for separation
B: Oversize (0.45 ... 1.04)
C: Halfsize (0.5 ... 3.5)
D: Type of material (1.0 ... 1.2)
E: Bulk density (0.5 ... 1.2)
F: Moisture (0.35 ... 1.0)
G: Type of screen (0.95 ... 1.2)
H: Wet screening (1.0 ... 1.45)
I: Deck position (0.7 ... 1.0)
J: Screening element (0.7 ... 1.25)
K: Fraction length (0.5 ... 1.25)
L: Accuracy demands (0.7 ... 1.7)

Bed depths

$$FBD = \frac{F}{C \times T \times W}$$

FBD: Feed end bed depth

$$DBD = \frac{O}{C \times T \times W}$$

DBD: Discharge end bed depth

Where:

F: Feed capacity in tph
O: Oversize in tph
C: Bulk density (tons/ cubic meter)
T: Rate of travel
W: Width of screens area

UNDERSTAND TO OPTIMIZE

It is important to take the whole process into consideration when problems occur on a screen, understanding the underlying reason for the problem. Sometimes adjustments are made to the screening media when the real issue is, for example, crusher settings, chutes or feeders.

COMMON PROBLEMS AND WHAT TO THINK ABOUT

1. Problem with throughput, where material is not being screened out and keeps recirculating. Having the knowledge to do a proper study to identify the real problem is key here. Look beyond the screening media to ensure you have found the root cause of the problem. Check for uneven loading or feed segregation as described below. Also check screen settings: changes to the speed or stroke may provide the solution.

2. Uneven loading over the width of the screen, or feed segregation. Changes to the feeding arrangement are likely to provide the solution. Adjustments to the crusher may also help. There is often limited benefit in changing the properties of the screening media before the feeding arrangements and screen settings have been optimized. Always check these issues if you experience throughput problems.

3. Output issues/economy. Make a close study of the process, ensuring you really get what you are aiming for. It might be better for overall economy to produce a smaller tonnage of higher-quality material than a higher total tonnage at lower quality. Having large amounts of unscreened final product will only cause high circulating loads in the process, so causing unnecessary wear on all the other equipment involved.

PROFITABLE QUARRYING: GET THE BIG PICTURE

Great athletes never stop striving to get closer to perfection. Neither do we. We believe that there is always room for improvement – a tweak here and a tweak there. We've always been driven to make better and better equipment. But today, we make an even bigger difference by understanding how the entire process works together.

Time to take a fresh look at your quarry or mobile crusher operation?
Contact your local representative or visit **construction.sandvik.com**.

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