INDUSTRIAL SCREENING

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INTRODUCTION

Screening is the practice of taking granulated ore material and separating it into multiple grades by particle size. Industrial sizing is extensively used for size separations from 300 mm down to around 40µm, although the efficiency decreases rapidly with fineness. Dry screening is generally limited to material above about 5 mm in size, while wet screening down to around 250µm is common.

GENERAL CATEGORIES

Screening falls under two general categories: dry screening and wet screening. From these categories, screening separates a flow of materials into grades, these grades are then either further processed to an intermediary product or a finished product. Additionally, the machines can be categorised into a moving screen and static screen machines, as well as by whether the screens are horizontal or inclined.

THE MAIN OBJECTIVES OF SCREENING

(a)***Sizing*** or***Classifying****:* to separate particles by size, usually to provide a downstream unit process with the particle size range suited to that unit operation;
(b) ***Scalping:***to remove the coarsest size fractions in the feed material, usually so that they can be crushed or removed from the process;
(c) ***Grading****:* to prepare a number of products within specified size ranges. This is important in quarrying and iron ore, where the final product size is an important part of the specification;
(d) ***Media recovery****:* for washing magnetic media from ore in dense medium circuits;
(e) Dewatering: to drain free moisture from a wet sand slurry
(f)***Desliming***or***de-dusting****:* to remove fine material, generally below 0.5 mm from a wet or dry feed
*(g)****Trash removal****:* usually to remove wood fibres from a fine slurry stream.

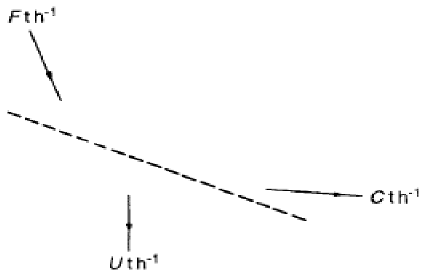
PERFORMANCE OF SCREENS

The screen is a surface having many apertures usually with uniform dimensions. Particles presented to that surface will either pass through it or be retained on it. The efficiency of screening is determined by the degree of perfection of separation of the material into size fractions above or below the aperture size.

There has been no universally accepted method of defining screen performance and a number of methods are employed. The most common screen performance criteria are those which define an efficiency based on the recovery of material at a given size, or on the mass of misplaced material in each product. This immediately leads to a range of possibilities, such as undersize in the overscreen product, oversize in the through-screen product, or a combination of the two.

An efficiency equation can be calculated from a mass balance across a screen as follows:

Consider a screen the feed to which is Fth^{-1}. Two products are generated. A coarse product of Cth^{-1} overflows from the screen, and a fine product of Uth^{-1} passes through the screen.



f = fraction of material above cut point size in feed
c = fraction of material above cut point size in overflow
u = fraction of material above cut point size in underflow

The mass balance on the screen is: F = C + U

The mass balance of the oversize material is: Ff = Cc + Uu

The mass balance of the undersize material is: F(1 - f) = C(1 - c) + U(1 - u)

Hence, $\frac{C}{F} = \frac{f-u}{c-u}$

And $\frac{U}{F} = \frac{c-f}{c-u}$

The recovery of oversize material into the screen overflow is:

$$\frac{Cc}{Ff} = \frac{c(f-u)}{f(c-u)}$$

and the corresponding recovery of undersize material in the screen underflow is:

$$= \frac{U(1-u)}{F(1-f)}$$

$$= \frac{(1-u)(c-f)}{(1-f)(c-u)}$$

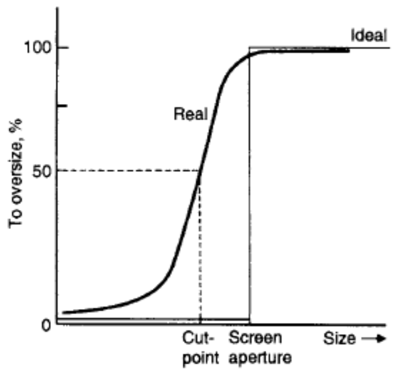
A combined effectiveness, or overall efficiency, E, is then obtained by multiplying the two equations together:

$$E = \frac{c(f-u)(1-u)(c-f)}{f(1-f)(c-u)^2}$$

For screens where the aperture and the cut point are similar, the amount of coarse material in the underflow is usually very low. A simplification of Equation can be obtained by assuming that $u = 0$, in which case the formula for fines recovery and that for the overall efficiency both reduce to:

$$E = \frac{c-f}{c(1-f)}$$

Formula such as the one derived are acceptable for assessing the efficiency of a screen under different conditions, operating on the *same feed.* They do not, however, give an absolute value of the efficiency, as no allowance is made for the difficulty of the separation. A feed composed mainly of particles of a size near to that of the screen aperture - "near size" material - presents a more difficult separation than a feed composed mainly of very coarse and very fine particles with a screen aperture intermediate between them. An *efficiency* or *partition curve* for a screen is drawn by plotting the partition coefficient, defined as the percentage of the feed reporting to the oversize product, against the geometric mean size on a logarithmic scale. The separation size, or *cut point,* is obtained at 50% probability, i.e. the size at which a particle has equal chance of reporting to the undersize or oversize product. The cut point is always less than the size of the largest apertures.



PARTITION CURVE

Factors affecting screen performance

Particle Size: Screen performance affected by factors that influence the probability of particle passage, and factors that influence the number of opportunities the particles are given to pass through the screen mesh.

Feed rate: The principle of sieve sizing analysis is to use a low feed rate and a very long screening time to effect an almost complete separation.

Screen angle: If a particle approaches the aperture at a shallow angle, it will see a narrower effective aperture dimension and near mesh particles are less likely to pass. The screen angle affects the speed at which particles are conveyed along the screen.

Particle shape: Most granular materials processed on screens are non-spherical. Spherical particles pass with equal probability in any orientation. Irregular shaped near-mesh particles must orient themselves in an attitude that permits them to pass. Elongated and slabby particles will present a small cross-section for passage in some orientations and a large cross-section in others. The extreme particle shapes therefore have a low screening efficiency.

Open area: The chance of passing through the aperture is proportional to the percentage of open area in the screen material, which is defined as the ratio of the net area of the apertures to the whole area of the screening surface. Open area decreases with the fineness of the screen aperture.

Vibration: Screens are vibrated in order to throw particles off the screening surface so that they can again be presented to the screen and to convey the particles along the screen.

Moisture: The amount of surface moisture present in the feed has a marked effect on screening efficiency.

Mathematical models of screens

Screen models aim to predict the size distribution and flow of the screen products. Models in the literature can be classified as:

(1)phenomenological models that incorporate a theory of the screening process
(2) empirical models based on empirical data;
(3) numerical models based on computer solutions of Newtonian mechanics.

Phenomenological models are based on the theory of particle passage through a screening surface.

The two dominant theories are *probabilistic*.

The model by Whiten (1972) extends the theory developed by Gaudin to develop an efficiency curve model containing a single model parameter.

The model by Ferrara and Preti (1975) describes rate of passage through the screen as a function of the screen length. They proposed a zero-order rate of passage for the heavily loaded section of the screen, followed by a first-order rate governing the passage of particles in the lightly loaded section of the process.

Both of these models have been used extensively

to model industrial screening data.

Empirical models aim to predict the required area of screen and are frequently used by screen manufacturers. There are a number of different formulations of these models. Most aim to predict the quantity of undersize that can pass through the screen.

Theoretical area required

$$\frac{total\ \frac{t}{h}\ undersize\ in\ feed}{C \times F1 \times F2 \ldots\ldots \times Fn}$$

C = Base-line screen capacity in t/h of undersize per unit area.

F 1 to Fn, are correction factors.

Common correction factors include corrections for the quantity of oversize, half-size , and near-size the density of material being screened; whether the screen is a top deck or a lower deck on a multi-deck screen; the open area of the screen cloth; whether square or slotted apertures are used; whether wet-screening is employed; and the desired screening efficiency.

The values of the base-line capacity and for each of the factors are given in the form of tables or charts. Karra (1979) has converted these data into equation form so that they can be implemented in a spreadsheet.

Numerical models: Numerical computer simulations are being increasingly used to model the behaviour of particles in various processing equipment including screens. It is expected that numerical simulation techniques such as the Discrete Element Method (DEM) will gain wider application in the modelling of industrial screens, and assist in the design and optimisation of new screening machines.

Screen Types

There are numerous different types of industrial screens available. The dominant screen type in industrial applications is the vibrating screen, of which there are many sub-types in use for coarse and fine-screening applications.

VIBRATING SCREENS

Vibrating screens are the most important and versatile screening machines for mineral Processing applications. The success of the vibrating screen has made many older screen types obsolete in the minerals industry including shaking and reciprocating screens. Vibrating screens have a rectangular screening surface with feed and oversize discharge at opposite ends. They perform size separations from 300mm in size down to 45µm and they are used in a variety of sizing, grading, scalping, dewatering, wet screening, and washing applications.

Vibrating screens of most types can be manufactured with more than one screening deck. On multiple-deck systems, the feed is introduced to the top coarse screen; the undersize falling through to the lower screen decks, thus producing a range of sized fractions from a single screen.

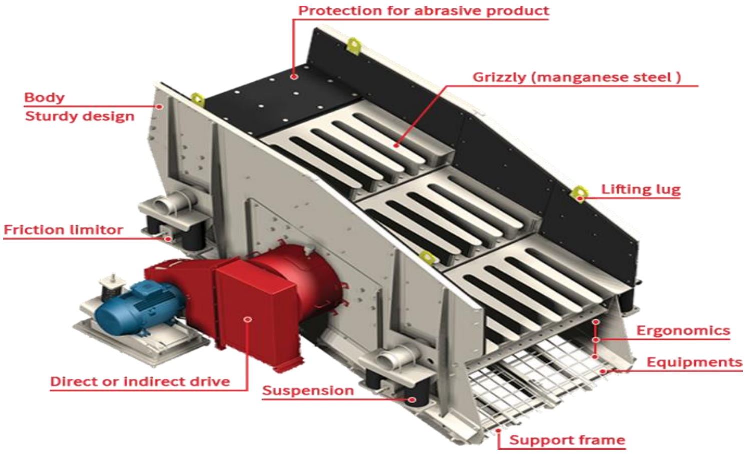
INCLINED SCREENS

Inclined or circular motion screens are widely used as sizing screens. A vertical circular or elliptical vibration is induced mechanically by the rotation of unbalanced weights or flywheels attached usually to a single drive shaft. The amplitude of throw can be adjusted by adding or removing weight elements bolted to the flywheels. The rotation direction can be contra-flow or in-flow. Contraflow slows the material more and permits more efficient separation, whereas in-flow permits a greater throughput. Single-shaft screens must be installed on a slope, usually between 15 °and 28 ° to permit flow of material along the screen.

The Inclined Screen is easily adjusted to improve overall performance and efficiency. Changes in slope, speed, stroke and direction of rotation allows the screen to be customized to the application.

GRIZZLY SCREENS

Very coarse material is usually screened on an inclined screen called a grizzly screen. Grizzlies are characterised by parallel steel bars or rails set at a fixed distance apart and installed in line with the flow of ore. The gap between grizzly bar is usually greater than 50 mm and can be as large as 300 ram, with feed topsize as large as 1 m.Vibrating grizzlies are usually inclined at an angle of around 20 ° and have a circular throw mechanism. The capacity of the largest machines exceeds 5000 t /h. The most common use of grizzlies in mineral processing is for sizing the feed to primary and secondary crushers. If a crusher has a 100mm setting, then feed can be passed over a grizzly with a 100mm gap in order to reduce the load on the crusher. The bars are typically made from wear-resistant manganese steel, and are usually tapered to create gaps that become wider towards the discharge end of the screen to prevent rocks from wedging between the bars. Domed or peaked profiles on the tops of the bars give added wear protection and prevent undersized rocks from "tiding" along the bars and being misplaced.



(GRIZZLY SCREENS)

HORIZONTAL SCREENS

Horizontal screens use elliptical motion for increased performance and efficiency. Their proven design help ensure operational safety and simple maintenance to drastically increase their service life and profitability.

Horizontal, low-head or linear vibrating screens have a horizontal or near-horizontal screening surface. Horizontal screens must be vibrated with a linear or an elliptical vibration produced by a double or triple-shaft vibrator. The accuracy of particle sizing on horizontal screens is superior to that on inclined screens; however, because gravity does not assist the transport of material along the screen they have lower capacity than inclined screens. Horizontal screens are used in sizing applications where screening efficiency is critical, and in drain-and-rinse screens in heavy medium circuits.

Resonance Screens

RT resonance screens are horizontal screens that function on the principle of resonance, with two oscillating frames connected by springs.It consisting of a screen frame connected by rubber buffers to a dynamically balanced frame having a natural resonance frequency which is the same as that of the vibrating screen body. The vibration energy imparted to the screen frame is stored up in the balancing frame, and re-imparted to the screen frame on the return stroke. The energy losses are reduced to a minimum, and the sharp return motion produced by the resonant action imparts a lively action to the deck and promotes good screening. RT screens are used for technological and final screening of grained non-sticky materials for dry and wet processing. Steel and polyurethane, finger and polyurethane membrane screening decks with lateral and modular fixation systems can be used.

(Resonance Screens -Mac's screens)

RT resonance screens are always fitted with rubber springs. They have the longest screening area and lowest installation height of any screen.

DEWATERING SCREENS

It is a type of vibrating screen that are fed a thick slurry and produce a drained sand product. Dewatering screens are often installed with a slight up-hill incline to ensure that water does not flow over with the product. A thick bed of particles forms, trapping particles finer than the screen aperture.

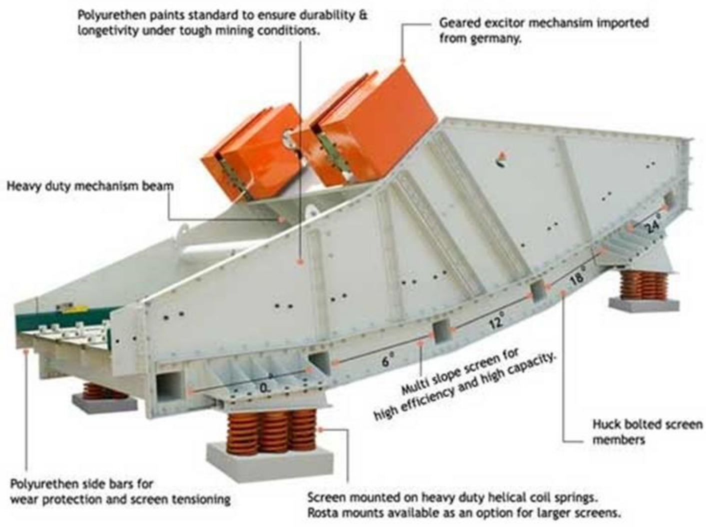
Two unbalanced motors with linear oscillation. At high frequency oscillation, the material is conveyed on a generally rising sieve, intensively compacted and optimally dewatered until delivery. Any dam bar can further increase the effect of dewatering the "circulating" material.

(Dewatering SCREENS)

This dewatering screen is ideally suited for dewatering mineral sand (e.g. 0-4 mm) or fine sand (e.g. 0-1 mm). Dewatering screens are equipped with a flat sieve made of PU that demonstrate high durability. The sorting of the screen makes it possible to send two different fractions from the chute to two conveyors.

Banana Screens

Banana or Multi-slope screens have become widely used in high-tonnage sizing applications where both efficiency and capacity are important. These multi-slope banana screens combines both worlds high capacity of a circular motion inclined screen and high efficiency of a horizontal linear motion screen. The offered banana screens are linear motion screens that are driven using geared exciters. Banana screens typically have a variable slope of around 40-30° at the feed end of the screen, reducing to around 0-15 ° in increments of 3.5-5° . Banana screens are usually designed with a linear-stroke vibrator.



The steep sections of the screen cause the feed material to flow rapidly at the feed end of the screen. The resulting thin bed of particles stratifies more quickly and therefore has a faster screening rate for the very fine material than would be possible on a slower moving thick bed. Towards the discharge end of the screen, the slope decreases to slow down the remaining material, enabling more efficient screening of the near-size material. The capacity of banana screens is significantly greater and is reported to be up to three or four times that of conventional vibrating screens.

Modular Screens

Modular screens such as the OmniScreen consist of two or more independent screen modules arranged in series, effectively making a large screen from a number of smaller units. A key advantage of this arrangement is that each screen module can be separately configured with a unique screen slope, screen surface type, vibration stroke, and frequency. This allows screening performance to be optimised separately on different sections of the screen. The individual screen sections being smaller and lighter are mechanically more robust compared with a single screen with an equivalent total size. Modular screens are frequently installed in a multi-slope configuration.

Mogensen Sizer

The Mogensen Sizer combines a linear drive action with steeply declined decks, fitted with oversized mesh apertures to produce a specialist screening system. This system is based on the probability of particles passing through a specified aperture within a pre-determined mesh length, thus producing a screen capable of tonnages far greater than conventional vibratory screens with the same footprint. The width of the unit, starting at 0.5m up to our 3m unit dictates tonnes per hour throughput; however screen length is shortened as the Mogensen Sizer uses a vertical material flow rather than conventional horizontal flow promoting better material separation and a low bed depth. This smaller footprint is more energy efficient, requires less support structure and is also more economical to maintain.

The Mogensen Sizer is extremely effective for fines removal, de-dusting applications and grading granular materials such as fine ores down to 400 microns. The Mogensen Sizer has a much higher throughput efficiency and higher separation method than standard vibratory screens and is a good solution for many applications. Examples of this are typically found in mining, quarries (limestone), coal de-dusting, detergent powders etc. where separations of 25mm down to 0.4mm are required with high through-puts. The Mogensen Sizer offers up to 7 separations of the material in one pass and is designed with customer specific bespoke outlets to handle these many product streams. Two Invicta Vibrator motors are used, normally mounted on the back of the unit to provide the required linear vibration. In most cases 6 pole motors are used that ensure a suitable vibration amplitude is achieved.

High Frequency Screens

High frequency screen consists of a vibrator, pulp distributor, screen frame,rack,suspension spring, mesh and other components. It has the advantages of high efficiency, small amplitude and high screening frequency, and is an effective equipment for screening and grading of fine materials. It is widely used in sieving and grading operation of iron ore, tin, tungsten, tantalum, niobium and other concentrator.

Efficient screening of fine particles requires a vibration with small amplitude and high frequency. Frequencies up to 3600 rpm are used to separate down to 100 microns compared with vibrating screens for coarser applications that are vibrated at around 700- 1200rpm. The vibration of the screening surface can be created by electric motors or with electrical solenoids. In the case of the Tyler H-series (or Hum-mer) screen, the vibrators are mounted above and connected by rods directly to the screening surface so that energy is not wasted in vibrating the entire screen body.
High-frequency wet screens such as the Derrick repulp screen permit screening down to 45 microns. Screening efficiency decreases rapidly once the free water has passed through the screen, therefore these screens incorporate water-sprays to periodically re-pulp the screen oversize to ensure good washing.

Screen Vibration

Circular Motion Screens

Circular vibrating screens, also called circular-motion vibrating screens, are used to classify medium to coarse-grained bulk materials (5.0 mm to 100 mm) for screening.
Circular vibrating screens operate using indirect excitation of the screen mesh. The entire screen frame is driven by unbalance masses, which produce a circular vibrating motion.

Another key feature: The directionless vibrations of the circular vibrating system have a steep launch angle and the screen area must be further tilted in order to achieve a suitable transport speed. The optimum angle has been proven to be 15° to 30° in practice.

When the shaft of an inclined screen is located precisely at the screen's centre of gravity, the entire Screen body vibrates with a circular vibration patternOccasionally, the shaft is installed above or below the centre of gravity.This placement results in an elliptical motion, slanting forward at the feed end; a circular motion at the centre; and an elliptical motion, slanting backwards at the discharge end. Forward motion at the feed end serves to move oversize material rapidly out of the feed zone to keep the bed as thin as possible. This action facilitates passage of fines which should be completely removed in the first one-third of the screen length. As the oversize bed thins down, near the centre of the screen, the motion gradually changes to the circular pattern to slow down the rate of travel of the solids. At the discharge end, the oversize and remaining near-size materials are subjected to the increasingly retarding effect of the backward elliptical motion. This allows the near-size material more time to find openings in the screen cloth.

Linear Vibration Screens

(Doubly Shaft Screens)

Linear vibrating screen is designed with dual-vibration motor drive, two synchronous motors are reversely placed so that the exciter generate reverse excitation force, the exciting force generated by eccentric block cancel each other out on the parallel direction of motor axis, and stack together with the perpendicular direction of motor axis, so its trajectory is linear. Linear vibrating screen is suitable for particle size from 0.074 -5 mm, the maximum size should be less than 10mm.

Linear stroke screens can be installed on a slope, horizontally or even on a small up-hill incline. The angle of stroke is typically between 30 ° and 60 ° to the screen deck. Linear-vibration exciters are used on horizontal screens and banana screens.

Linear vibrating screen is widely used in mining, coal, refractories, metallurgy, building materials and other industries. It is usually used for the screening and grading materials in large, middle and small particles.

Oval Motion Screens

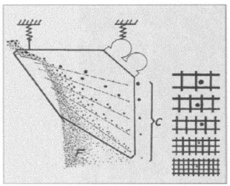
(Triple- Shaft Screens)

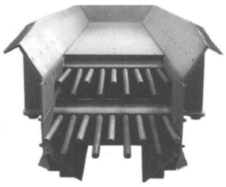
A three-shaft exciter design can be used to generate an elliptical vibratory motion which can also be used on horizontal and banana screens. The three shafts are connected by gears and one of the shafts is driven. The elliptical motion is claimed to offer the efficiency benefit of a linear vibrating screen with the tumbling action of a circular motion screen. Higher capacities and increased efficiencies are claimed over either linear or circular motion machines.

OTHER SCREEN TYPES

Static grizzlieswith no vibration mechanism are used in scalping applications. They are installed at a slope of 35-50 degrees. Static grizzlies are less efficient than their vibrating counterparts and are usually used in scalping applications when the proportion of oversize material in the feed is small.

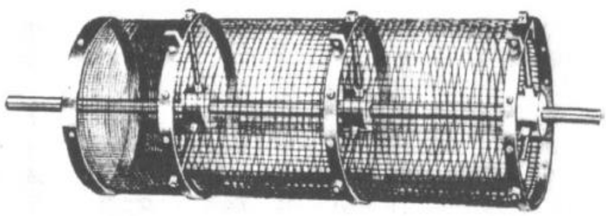
Mogensen divergatorsand **self-cleaning grizzly** screens use round bars in two rows-alternate bars at different angles, and fixed at one end to prevent the possibility of blinding. Divergators are used for coarse separations between 25 and 400mm. Divergators are used in grizzly scalping and in chutes to direct the fine material onto the conveyor first to cushion the impact from coarser lumps.





Mogensen sizer separting into and fines F   Self-cleaning grizzlycoarse C

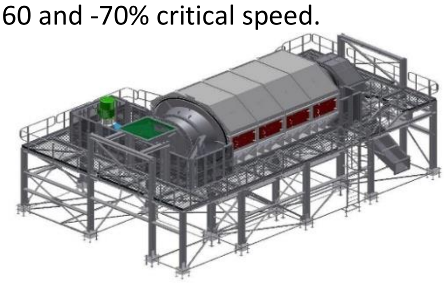
TROMMELSOne of the oldest screening devices is the trommel or revolving screen, which is a cylindrical screen typically rotating at between 35 and 45% critical speed. Trommels are installed on a small angle to the horizontal or use a series of internal baffles to transport material along the cylinder. Trommels can be made to deliver several sized products by using trommel screens in series from finest to coarsest such as the one shown, or using concentric trommels with the coarsest mesh being innermost. Although trommels are cheaper, vibration free, and mechanically robust, they typically have lower capacities than vibrating screens since only part of the screen surface is in use at any one time, and they can be more prone to blinding.



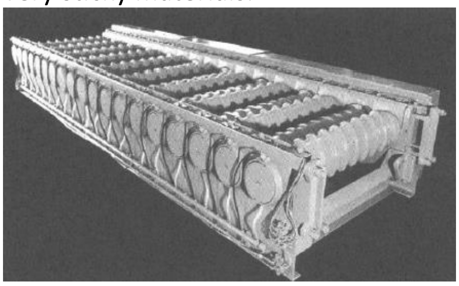
Rotaspiral is a trommel-like device designed for ultra-fine screening between 1000 and 75 microns.

The drum contains an internal spiral to move the material through the screen. Water sprays are used to fluidise the screen bed and wash the screen surface. The Rotaspiral can also be used in a dewatering duty.

Bradford Breakeris a variation of the trommel screen used in the coal industry. It serves a dual function of breaking coal, usually to between -75 and -100mm, and separating the harder shale, rock tramp metal, and wood contaminants into the oversize. Bradford breakers are operated at between 60 and -70% critical speed.

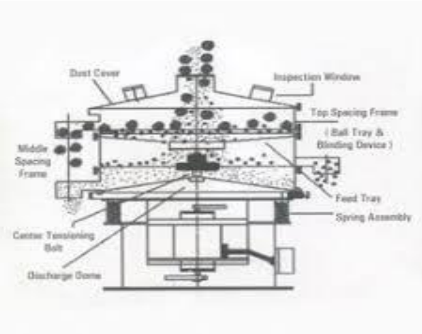


Roller screens can be used for screening applications from 3 to 300 mm. Roller screens use a series of parallel driven rolls or discs to transport oversize across the series of rolls while allowing fines to fall through the gaps between rolls or discs. Roller screens offer advantages of high capacity, low noise levels, require little head-room, subject the material to less impact, and permit screening of very sticky materials.



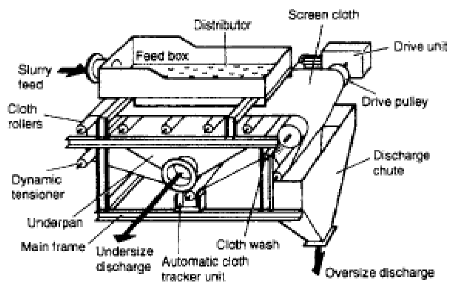
Circular, Gyratory, or **Tumbler** screens impart a combined gyratory and vertical motion. They are widely used for fine screening applications, wet or dry, down to 40 µm. The basic components consist of a nest of sieves up to around 2.7 m in diameter supported on a table which is mounted on springs on a base, suspended from beneath the table is a motor with doubleshaft extensions, which drives eccentric weightsand in doing so effects horizontal gyratory motion.

Vertical motion is imparted by the bottom weights, which swing the mobile mass about its centre of gravity, producing a circular tipping motion to the screen, the top weights producing the horizontal gyratory motion. Ball trays and ultrasonic devices may be fitted below the screen surfaces to reduce blinding. Circular screens are often configured to produce multiple size fractions.



Sieve Bends are static screens that can be used for very fine wet screening operations. The Sieve Bend has a curved screen composed of horizontal wedge bars. These are used for either dewatering or classification. Slurry flows by gravity over an inclined screen surface. Screen wires, which are perpendicular to flow, slice away a layer of slurry. The wires can be as narrow as 50 µm and up in 25 µm increments. This creates a sieve, which presents more edges to the flow for superior separation efficiency. The dewatering capability of the screen is determined by the percent of open area.

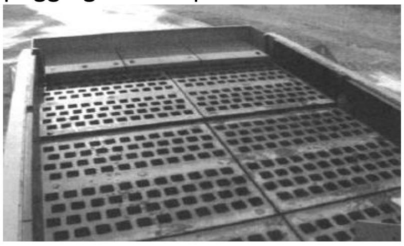
Linear screen developed by Delkor is predominantly used for removing wood chips and fibre from the ore stream feeding carbon-in-pulp systems, and for the recovery of loaded carbon in gold CIP circuits. The machine comprises a synthetic monofilament screen cloth supported on rollers and driven by a head pulley coupled to a variable speed drive unit. Mesh sizes in use are typically around 500 microns. Dilute slurry enters through a distributor on to the moving cloth. The undersize drains through the cloth by gravity and is collected in the underpan. The oversize material retained on the screen is discharged at the drive pulley, and any adhering material is washed from the screen cloth using water sprays.



Screening surfaces

There are many types of screening surface available for industrial vibrating screens. The selection of screening surface for a particular duty will depend on the aperture required and the nature of the work. The selection of the size and shape of the apertures, the proportion of open area, the material properties of the screening surface, and flexibility of the screen surface can be critical to the performance of a screening machine.

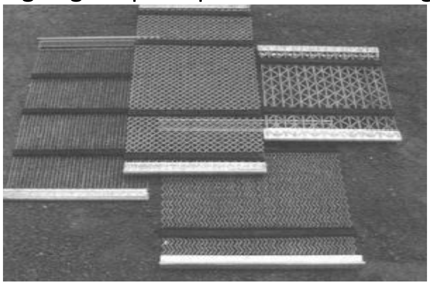
Bolt-in screening surfaces for screening duties with particles larger than around 50 mm frequently consist of large sheets of punched, laser-cut, or plasma-cut steel plate, often sandwiched with a polyurethane or rubber wear surface to maximise wear life. These sheets are rigid and are bolted to the screen. Curved sections of screens of this type are also commonly used on trommels. These screening surfaces are available with custom-designed aperture shapes and sizes. Apertures usually have a tapered profile, becoming wider with depth, thereby reducing the propensity of particles pegging in the aperture.



Tensioned screening surface*s* Tensioned screen surfaces consist of cloths that are stretched taut, either between the sides of the screen or along the length of the screen. Maintaining the correct tension in the screen cloth is essential to ensure screening efficiency and to prevent premature failure of the screening surface. Tensioned screens are available in various wire weaves as well as polyurethane and rubber mats.

Traditional woven-wirecloth,usually constructed from steel or stainless steel, remains popular. Wire cloths are the cheapest screening surfaces, have a high open area, and are comparatively light. The high open area generally allows a screen to be smaller than a screen with modular panels for the same capacity duty. In relatively light screening duties, therefore, wire-tensioned screens are often preferred. Increasing the wire thickness increases their strength, but decreases open area and hence capacity.

Self-cleaning wiretraditionally, blinding problems have been countered by using wire with long-slotted apertures or no cross-wires at all but at the cost of lower screening efficiency. Self-cleaning wire is a variation on this, having wires that are crimped to form "apertures" but individual wires are free to vibrate and therefore have a high resistance to blinding and pegging. Screening accuracy can be close to that of conventional woven wire mesh; and they have a longer wear life, justifying their higher initial cost. There are three main types of self-cleaning weave: diamond, triangle, and wave or zig-zag shaped apertures. The triangle and diamond weaves give a more efficient separation.



Modular screening surfaces The most popular screening surfaces in harsh screening duties are polyurethane and rubber screen decks, usually assembled in modules or panels that are fixed onto a sub-frame. Both materials offer exceptional resistance to abrasion. Rubber also has excellent impact resistance; therefore, rubber is often used in applications where top size can be greater than around 2" (50 mm). Polyurethane is generally preferred in wet screening applications. The major advantage of modular polyurethane panels is the exceptional wear resistance in most applications; often 10 times the wear life is reported over traditional wire cloth. Modular screens do not require tensioning and re-tensioning and damaged sections of the screen can be replaced in situ. Polyurethane and rubber screens are also quieter and the more flexible apertures reduce blinding compared with steel wire cloths.