

PORTAL AND BRIDGE SCRAPER RECLAIMERS - A COMPARISON

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INTRODUCTION

In the short period available, this presentation will try to identify the main features of the machines, their similarities, and differences.

PORTAL and BRIDGE reclaimers form part, the largest part, of a whole range of scraper chain reclaimers. This range includes PORTAL, BRIDGE, Cantilever and Circular reclaimers, and a wide range of special configurations for longitudinal and circular stockpiles.

To simplify this presentation the description and illustrations will concentrate on the most common arrangement, that of longitudinal stockpiles.

GENERAL

Both PORTAL and BRIDGE reclaimers are Scraper reclaimers. They reclaim previously stacked material from a stockpile using scraper blades mounted onto two parallel strands of chain.

The chain is mounted on a boom, and runs at right angles to the stockpile apex. The chain is driven at the discharge end, pulling the material off the stockpile with the scraper blades along its bottom strand. The reclaimed material is then discharged onto a conveyor.

The boom must be carried by the reclaimer along the length stockpile. To enable this, a rail is provided usually at ground level on either side of the stockpile, running parallel to the stockpile apex. The reclaimer structure, carrying the boom, is mounted onto the rails by wheels located in end carriages. Some of these wheels also drive the reclaimer along the rails.

To power the various drives mounted on the reclaimer, and to provide a control system, power and control cables are necessary. Cable reels are often used to connect the machine to the fixed power and control points on the stockpile.

The selection of either a portal or bridge machine is usually decided by the amount of blending required in the reclaimed product.

PORTAL SCRAPER RECLAIMER

Where reclaiming can be accepted from the side face of the stockpile, a PORTAL reclaimer is usually the most economic solution.

A PORTAL reclaimer is named after the shape of the reclaimer body connecting the two end carriages. This structure is usually similar in shape to an inverted " V " or portalised frame.

The PORTAL reclaimer is usually selected when blending is NOT a major requirement and material segregation is not critical, or where the stacking method provides a sufficient standard of blending. Its major advantage is being able to reclaim from any stockpile in any sequence.

MAIN COMPONENTS

End Carriages: located on a rail on either side of the stockpile, containing a mixture of driven and undriven wheels.

The drives are often variable speed. It is usual to have two or more driven wheels per reclaimer.

PORTAL Structure: a frame in the shape of an inverted " V " spans from one end carriage to the other. Onto this frame various items are mounted.

Boom : carrying two strands of chain onto which are mounted evenly spaced scraper blades. The boom includes guide rails locating the chain and scraper blades. At one end the chain passes around a tail sprocket, and at the discharge end a driven sprocket.

Pivot : the boom is provided with a pivot to allow the scrapers to be positioned on, and reclaim from, the side face of the stockpile. The pivot is located at the discharge end, near the base of the stockpile.

Winch : mounted on the PORTAL frame, using a wire rope and sheave system, is used to lift the free end of the boom , while the other end is fixed to the pivot.

Chain drive: the chain drive is mounted above the discharge side end carriage. The chain drive is usually a fixed speed drive.

Cable reels: the reclaimer receives power and control via cable(s) from a fixed point near the rail. This is usually done by cable reels mounted on the end carriages.

Ramp Trough: on many installations it is necessary to provide a short fixed ramp trough at the discharge end of the scrapers. This ramp trough and the scrapers elevate the material to provide a discharge height above a ground line belt conveyor.

METHOD OF RECLAIM

The reclaimer will be driven along the rails to the selected stockpile with the boom in the fully elevated position, using fast travel speed. The PORTAL body of the reclaimer allowing it to pass over full or part full stockpiles.

The stacking system will have produced a reasonably shaped stockpile, or the operator will set the boom angle manually, and use the reclaimer to trim the side face of the stockpile into an even angle prior to automatic operation.

The reclaimer boom will then be lowered automatically by a preset depth of cut, and the reclaimer will move along the stockpile scraping the material off the side

slope into the reclaim conveyor. Discharge rate can be adjusted by variable travel speed control on the wheel drives, and/or changing the depth of cut.

Larger capacity machines could have double scraper booms in parallel. Reclaimers in buildings could have two part articulated booms.

BRIDGE SCRAPER RECLAIMERS

Where reclaiming must be carried out on the end face of a stockpile a BRIDGE reclaimer is necessary.

The BRIDGE reclaimer is named after the reclaimer body connecting the two end carriages. This structure, spans from one end carriage to the other, and is a BRIDGE like beam, parallel to the ground.

The BRIDGE reclaimers are selected where PORTAL reclaimers are unable to provide the blending and/or the protection against size segregation that is required. BRIDGE reclaimers reclaim material from the end face of the stockpile. BRIDGE reclaimers have the disadvantage of being trapped between stockpiles and are therefore only able to reclaim from adjacent stockpiles.

MAIN COMPONENTS

End Carriages: located on a rail on either side of the stockpile, containing a mixture of driven and undriven wheels.

The drives are usually a two speed drive with the slow speed being variable speed. It is usual to have two or more driven wheels per reclaimer.

BRIDGE Structure: a beam or BRIDGE structure fixed to both end carriages. Onto this BRIDGE various items are mounted.

Boom: carrying two strands of chain onto which are mounted evenly spaced scraper blades. The boom includes guides locating the chain and scraper blades. At one end the chain passes around a tail sprocket, at the other a drive sprocket. The boom is built as an integral part of the BRIDGE structure and is non liftable. The scrapers thus reclaim from the base of the end face of stockpile only.

Chain drive: the chain drive is mounted above the discharge side end carriage. The chain drive is usually a fixed speed drive.

Harrow: a grid frame mounted onto the BRIDGE is positioned onto the stockpile end face. It is moved with a reciprocating action across the face, keeping the end face at a set angle preventing uneven feed to the scrapers. If the reclaimer is required to reclaim in both directions then a harrow is required for each direction.

Cable reels: the reclaimer receives power and control via cable(s) from a fixed point near the rail. This is usually done by cable reels mounted on the end carriages.

Ramp Trough: on many installations it is necessary to provide a short fixed ramp trough at the discharge end of the scrapers. This ramp trough and the

scrapers to elevate the material to provide a discharge height above a ground line belt conveyor.

METHOD OF RECLAIM

The reclaimer is positioned at the toe end of the stockpile. With the harrow and chain drive running the reclaimer advances into the pile using the end carriage wheel drives.

The reclaim rate is controlled by adjusting the wheel drive speed. BRIDGE reclaimers always use a simple Chevron stacking method. This stacking method, combined with a harrow that moves across the full end face of the stockpile, provides blending efficiencies equal to drum reclaimers.

It should be noted that until the reclaimer is at the full end face of the stockpile the blending efficiency and the reclaim rates are affected adversely.

COMPARISON SUMMARY

PORTAL RECLAIMER	BRIDGE RECLAIMER
Very limited blending capability with simple stacker.	Good blending capability with simple stacker.
Can reclaim any stockpile in any sequence.	Can only reclaim in a specific sequence
No harrow required	A harrow required for each direction of travel
Two sets of scrapers can be built - Double boom	One set of scrapers only
Up to 4000 tons per hour	Up to 3000 tons per hour
Up to 65 m span	Up to 65 m span

Using a more expensive slewing stacker some blending can be achieved from a PORTAL reclaimer.

PORTAL - BRIDGE SCRAPER RECLAIMER

The logical development on scraper reclaimers is to have a reclaimer with the full end face reclaiming capability of the BRIDGE reclaimer with the operating flexibility of the PORTAL reclaimer.

The PORTAL-BRIDGE reclaimer consists of a portalised structure with a liftable boom as for the PORTAL reclaimer. It can therefore operate as a PORTAL reclaimer and reclaim from the side face of the stockpile. As a result all the advantages of a PORTAL reclaimer are provided.

The Boom can also be lowered into a BRIDGE position and held between the end carriages. This allows the reclaimer to operate as a BRIDGE reclaimer and reclaim from the end face of the stockpile.

In the bridge position a harrow is necessary. This consists of an inverted vee harrow frame positioned at the correct angle by a winch. This frame supports the upper end of two parallel wire ropes with light scrapers mounted between them. The harrow scrapers are moved continuously across the end face of the stockpile, rather like a windscreen wiper blade action.

As a result the PORTAL-BRIDGE reclaimer in the bridge mode ensures good blending/homogenising by reclaiming from the full end face of a simple Chevron stacked stockpile.

The PORTAL-BRIDGE reclaimer is most suitable where a blending reclaimer is needed to reclaim different products or grades of product from an in-line stockpile arrangement.

The largest PORTAL BRIDGE Reclaimer to date is a 50 m span and 1250 tph. PORTAL, BRIDGE AND PORTAL-BRIDGE Scraper Reclaimers are reliable and economical reclaimers and work on a wide range of bulk material as a result. Scraper reclaimers are by far the most commonly selected type of reclaimer.

REFERENCES

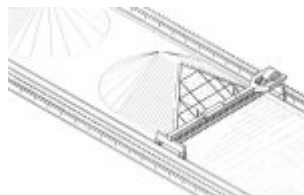
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Portal Reclaimer



Portal Reclaimer and Stacker



Bridge Reclaimer



Bridge Reclaimer and Stacker



Portal Bridge Reclaimer



Portal Bridge Reclaimer and Stacker