



CONSOL Marine Terminals LLC, Baltimore Terminal (CMTL)

Coal is delivered to the terminal by either of two railroads: *Norfolk Southern Corporation* and *CSX Rail Transportation*. The coal is unloaded by a dual-car rotary dumper, then travels on conveyors to customer-specific stockpiles. Along that network, coal can be sampled by the **As-Received Mechanical Sampling System** located on the C-2 conveyor which is 1800 mm (72 in.) in width.

When a vessel (or barge) is loaded the coal is reclaimed from stockpile(s) by one or both **Stacker/Reclaimers**. As the coal travels to the vessel it can be sampled by the **As-Shipped Mechanical Sampling System** or **Mechanical Part-stream Sampler**, both are located on the C-6 conveyor which is 2100 mm (84 in.) in width.

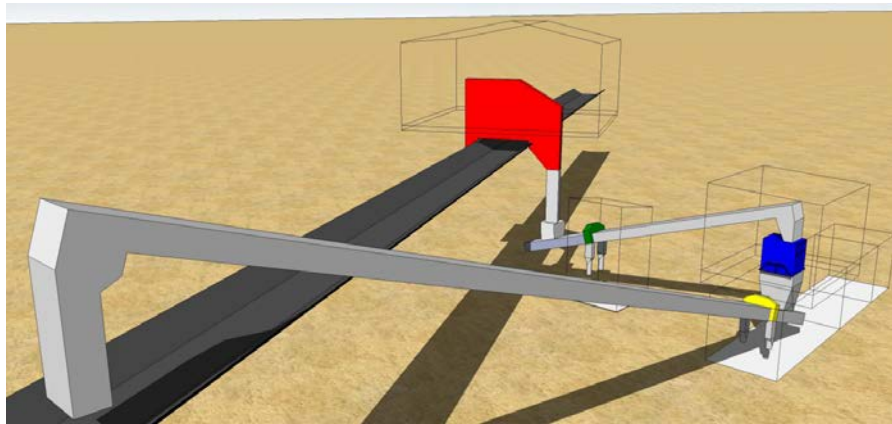
Both the As-Received and the As-Shipped Mechanical Sampling Systems were manufactured by the **James A. Redding Company** (JARCO) and were installed in 2011. The Mechanical Part-stream Sampler was manufactured by **Precision Samplers Inc.** (PSI) and was installed in 2015. The designs and operating programs for all sampling systems are described below.

As-Shipped Mechanical Sampling System (AS)



(Measurements and weights provided herein are approximate and for general reference only.)

The system's key components are listed below and operate to meet or exceed ASTM standards when accepting a product of 75 mm x 0 (3 in. x 0) or less.



Primary Sampler - This cross-belt component (red) operates at a minimum 1.5 times the speed of the C-6 conveyor (black) as it extracts a 71.8 kg (158 lb.) increment every 29 seconds. The cutter opening is 225 mm (9 in.) in width. Each primary increment is gravity-fed to the Primary Feeder Conveyor. A plugged-chute indicator and a vibrator are installed on the transfer chute between the Sampler and the Primary Feeder Conveyor to facilitate the flow of material.

Primary Feeder Conveyor - This 600 mm (24 in.) wide, enclosed conveyor (gray, narrow) operates at 0.2 m/s (31 fpm.) as it moves material passed the Size-Bulk Sampler to the Crusher.

Size-Bulk Sampler - This component is utilized for collecting an uncrushed sample - for a size analysis or other special testing - which is separate from the sample collected for the standard chemical analyses. This cross-belt cutter (green) operates at a minimum 1.5 times the speed of the Primary Feeder Conveyor and extracts a 5.5 kg (11 lb.) increment. The cutter is bi-directional in its operation by means of a dual-head cutter, with each opening being 228 mm (9.1 in.) in width. Increments are gravity-fed into heavy duty-bags affixed to collection chutes.

Hammer Mill Crusher - The Jeffrey-Rader 34ABE Crusher (blue) is comprised of a motor, a rotor with fixed hammers and a combined set of round-holed screens. The front and middle screens have 16 mm (5/8 in.) holes and the rear screen has 19 mm (3/4 in.) holes. A plugged-chute indicator and a vibrator are installed at both the inlet and outlet chutes of this component to facilitate material flow. Sample material is crushed down to a top size of 4-mesh, then gravity-fed through a chute to the Secondary / Reject Conveyor.

Secondary / Reject Conveyor - This 600 mm (24 in.) wide, enclosed conveyor (gray, wide) operates at 1.1 m/s (221 fpm). It moves crushed material passed the cross-belt Secondary Sampler. Material not retained in the final save sample is deposited back to the main flow on the on the C-6 conveyor.

Secondary Sampler - This cross-belt component (yellow) operates at a minimum 1.5 times the speed of the Secondary / Reject Conveyor as it extracts a 0.1 kg (0.3 lb.) increment every 18 seconds. Component operation is bi-directional by means of a dual-head cutter with each cutter opening being 53 mm (2.1 in.) in width. Increments are gravity-fed into heavy-duty bags affixed to collection chutes.

Save Sample Ratio - The sampling system is designed to collect approximately 4.8 kg (10.5 lb.) of final-save sample per 1,000 net tons of material.

Mechanical Part-stream Sampler (MPS)



The Mechanical Part-stream Sampler (MPS) is primarily an alternate mechanized sampling device that can be placed into service in the event the AS is inoperable. Having this back-up sampling device available eliminates the need for personnel to manual sample off the conveyor, and therefore avoids potential safety hazards associated with that sampling method. The MPS can also be used in tandem with the AS to collect extra uncrushed sample material for a size analysis or other special test.

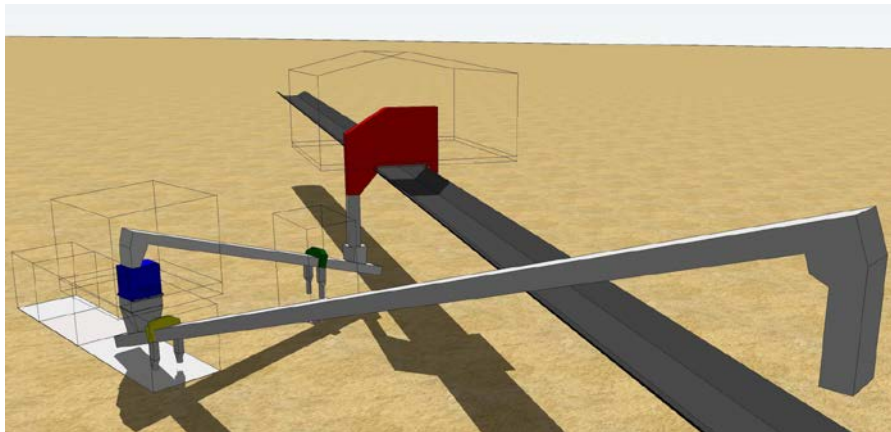
The collection equipment is comprised of two scoops (bottom, right), which normally are designed to operate in conjunction with one another. However, if one of the scoops fails the other scoop can continue to operate. Sample increments are gravity-fed through two independent collection tubes, located on opposite sides of each MPS, down to heavy-duty bags located at ground level. The increments are a minimum weight of 3.0 kg (6.9 lbs.) each, depending on the type of material and flow rate of the main conveyor. The sampling frequency is adjustable per the type of sampling required.



As-Received Mechanical Sampling System (AR)



The system's key components are listed below and operate to meet or exceed ASTM standards when accepting a product of 75 mm x 0 (3 in. x 0) or less. The system can be set to operate at multiple belt speeds and cutter frequencies to accommodate special sample requests for consignments down to 5,000 tons.



Primary Sampler - This cross-belt component (red) operates at a minimum 1.5 times the speed of the C-2 conveyor (black) where it extracts a 70.7 kg (155.8 lb.) increment every 35 seconds. The cutter opening is 228 mm (9.1 in.) in width. A plugged-chute indicator and a vibrator are installed on the transfer chute between the Sampler and the Primary Feeder Conveyor to facilitate material flow. Sample material is gravity-fed to the Primary Feeder Conveyor.

Primary Feeder Conveyor - This 600 mm (24 in.) wide, enclosed conveyor (gray, short) travels at 0.1 m/s (18 fpm) as it moves material passed the Size-Bulk Sampler to the Crusher.

Size-Bulk Sampler - This component is utilized for collecting a sample - for a size analysis or other special testing - which is separate from the sample collected for the standard chemical analyses. This cross-belt cutter (green) operates at a minimum 1.5 times the speed of the Primary Feeder Conveyor and extracts a 3.5 kg (7.8 lb.) increment. The component is designed to collect a maximum of one increment per each primary increment. The cutter is bi-directional in its operation by means of a dual-head cutter, with each opening being 228 mm (9.1 in.) in width. Increments are gravity-fed into heavy duty-bags affixed to collection chutes.

Hammer Mill Crusher - The Jeffrey-Rader 34ABE Crusher (blue) is comprised of a motor, a rotor with fixed hammers and a combined set of round-holed screens. The front and middle screens have 16 mm (5/8 in.) holes, and the rear screen has 19 mm (3/4 in.) holes. A plugged-chute indicator and a vibrator are installed at both the inlet and outlet chutes of the Crusher to facilitate material flow. This component processes sample material down to a top size of 4-mesh, then gravity-fed through a chute to the Secondary / Reject Conveyor.

Secondary / Reject Conveyor - This 600 mm (24 in.) wide, enclosed conveyor (gray, long) operates at 0.6 m/s (114.0 fpm) as it moves material toward and passed the Secondary Sampler. Material not retained for the final save sample is deposited back to the main flow on the C-2 conveyor.

Secondary Sampler - This cross-belt component (yellow) operates at a minimum 1.5 times the speed of the Secondary / Reject Conveyor where it extracts a 0.2 kg (0.4 lb.) increment every 28 seconds. Component operation is bi-directional by means of a dual-head cutter with each opening being 53 mm (2.1 in.) in width. Increments are gravity-fed into heavy-duty bags affixed to collection chutes.

Save Sample Ratio - The sampling system is designed to collect approximately 4.7 kg (10.3 lb.) of final-save sample per 1,000 net tons of coal.

Additional Services

SAI offers additional services in the Baltimore area, directly or through our partnerships. Examples are: sampling system assessments and audits, truck auger sampling, temperature monitoring surveys, cargo inspections, and draft surveys.





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