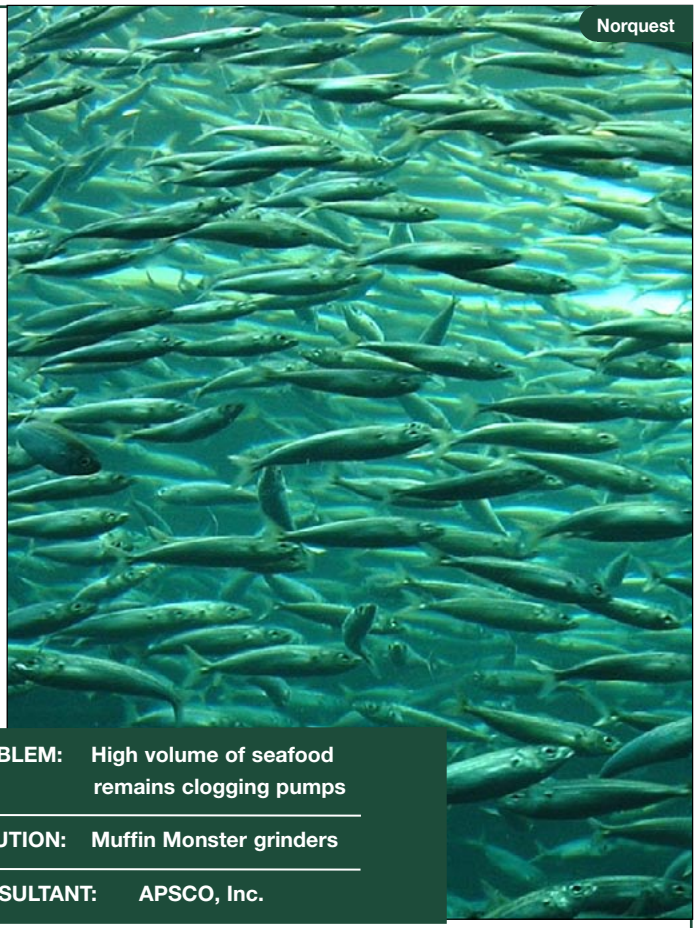


PROBLEM: High volume of seafood remains clogging pumps

SOLUTION: Muffin Monster grinders

CONSULTANT: APSCO, Inc.

Monster Solutions

Major Seafood Processor Tackles Tough Alaskan Aquatics

Cordova, AK – Managers for seafood processing plants operated by Norquest Seafoods Inc. report significantly improved discharge compliance through installation of special Muffin Monster® grinders for remains processing. They also note easier operation, lowered power requirement, reduced maintenance, and enhanced safety for remains handling.

The Muffin Monster grinders, designed and manufactured by JWC Environmental in Costa Mesa, CA, were provided locally by APSCO Inc. of Kirkland, WA.

"We're required to grind remains, such as fish heads, to particles with diameters of ½" (12mm) or less before we can discharge them into Alaskan waters," noted Lee Murrell II, now roe manager at the Cordova plant. "When we replaced our previous grinder with a Muffin Monster on our Aleutian Falcon floating processor, we were able to meet requirements consistently for all the various seafood remains we put through. It also ended the problem of the grinders plugging up, overflowing, and having to be reversed to clear them."

"Then, we installed them for the startup of the land-based Adak plant in 2001," he continued, "we had excellent results there as well. Now we've installed Muffin Monsters company-wide."

Murrell said the Aleutian Falcon was processing 10-11 million lbs. (4-5million kg) of round product annually, including salmon, herring and snow crab, operating around-the-clock for five months, with remains volume running at about 23%, or 2.5 million lbs. (1 million kg), before grinding.

The Adak plant, established to gain a foothold for the company in processing of Pacific cod ("pcod"), success was documented initially through 45 consecutive days of 24/7 operation, with volume averaging about 150,000 lbs/day (68,000 kg) of pcod, halibut, rock fish, and king crab round product, with remains volume running at about 55%.

Muffin Monsters readily grind up the many types of seafood remains conveyed into its specially designed cutter teeth.

"That included the grinder handling heavy-duty #6 and #7 stainless steel fish hooks, with 12/0 or 13/0 openings, that we couldn't remove from 100% of the heads," he noted. "It also had to grind rocks ingested by the pcod. In an effort to minimize replacement of the grinding teeth and gears, we worked to eliminate them, by removing the fish stomachs."

At the Cordova plant, manager Bill Gilbert also noted improved discharge compliance through the installation of a Muffin Monster grinder, while plant engineer Brian Parsons proposed the installation of another grinder.

"We've improved the discharge compliance to about 95% with the Muffin Monster, and are installing

another one for secondary treatment so we can increase it even more," Gilbert said.

At the Chignik plant, production manager John Lombardo has observed significant operational and safety improvements as well as improved discharge compliance since the installation of the grinder in 1999. A second unit was added in 2004.

"The previous unit operated similar to a hand-held meat grinder in a butcher shop," he recalled, "an auger pushed remains into a blade against a perforated plate with ½" (12mm) diameter holes. The remains were pressed out the other side. Maintaining the ½" (12mm) size was inconsistent and difficult."

"Meanwhile, it was limited by the width of the deepest groove of its auger ," he continued. "It could handle 5" (127mm) round heads from regular salmon, but 8" (200mm) or larger heads, from king salmon or halibut, would pop up and down unless we forced them downward by hand."

"We handled the input problem by chopping larger salmon heads in half with a butcher knife, and installed a bandsaw for the larger halibut heads."

"With the Muffin Monster—all that is history. If we put a 200lb. (90 kg) fletched halibut in tail first – it sucks the carcass right in. We can put a whole 30lb. (14 kg) halibut head in the grinder, and it is reduced to puree in about 15 seconds."

"The grinders are virtually maintenance-free during a processing season. We change the blades every other season, unless pcod are processed with rocks in their stomachs."

Dale McBain of APSCO Inc., JWC Environmental's local application representative, recalled that power consumption had also been a major concern with the previous grinder.

"In addition to having a larger footprint and lower feed rate, the previous manufacturer's units ran at a minimum of 30 HP (22 kW)," he said. "The Muffin Monster runs at a mere 5 HP (3.7 kW), maintains the feed rates needed, and was easy to integrate into their production operations."

"They've been successfully installed in different orientations, including at a 45 degree angle to the floor, so gravity holds the remains against the cutter; and horizontally, with the cutters pointing straight up, receiving feed from a hopper above the unit."

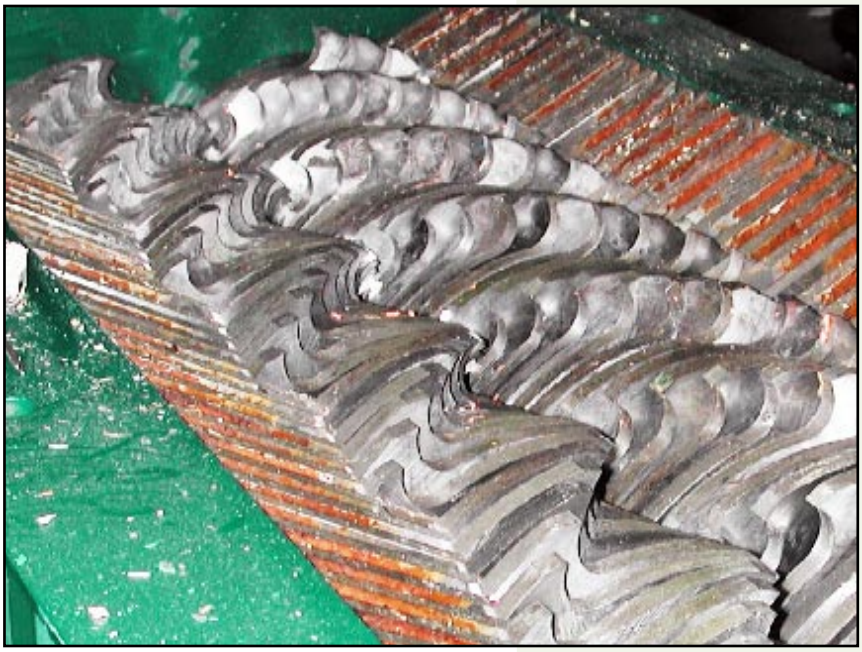
The dual-shafted Muffin Monster grinds a wider variety of solids than single-shafted machines, while its low-speed operation results in higher torque and fewer interrupts. Its special cutter teeth were developed specifically for fish remains processing.

Muffin Monster grinders effectively reduce particle size of wood, plastics, rocks, nuts, bolts, wire, sludge, and other foreign material that would otherwise foul, clog or damage waste stream and process equipment, typically reducing the handling costs associated with solids removal.

JWC adds that the grinder adapts to most applications with little or no modification to piping, channel, or power, and offer high-pressure – 90 psi (6 bars) capability, with no seal flush required and no packing gland to adjust.

"We've improved the discharge compliance to about 95%…"

"The Muffin Monster runs at a mere 5 HP (3.7 kW), maintains the feed rates needed, and was easy to integrate into their production operations."



The specially designed cutters can slice through a 200lb. (90 kg) halibut and turn it into puree within seconds.

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