



## Live Bottom Replacement Screws for Solvay Wood Pellet Plant in Quitman, MS

### General Description of the Application

Solvay is an international chemical company dedicated to developing innovative solutions for customers around the world. Solvay's products serve diversified markets, from consumer goods to energy. One of Solvay's more recent ventures has been wood pellet manufacturing. The Solvay plant in Quitman, MS produces wood pellets that are formed from compressed wood waste fines. The pellets are sold in two forms - torrefied or non-torrefied pellets. Torrefied pellets are created by roasting the materials at a very high temperature while also removing all oxygen from the environment. After this process, the material is ground and compressed into pellet form. The result is a pellet with a much higher potential energy, which can even be used in coal fired power plants as an alternative to a costly conversion to natural gas.

Wood pellet production begins by introducing raw materials such as wood chips, fibers and fines from large drying piles into the process. Front-end loaders load raw materials into a large hopper with a twelve-screw live bottom feeder. Live bottom feeders are ideal for the application, but screw feeder design and construction is critical to proper operation. The existing live bottom screws were failing on a regular basis and Solvay contacted KWS for help. KWS analyzed the root cause of the failures and provided a superior design that would provide many years of uninterrupted operation.

### Design Parameters of Application

**Product Type:** Wood Chips, Fibers & Fines

**Material Density:** 15 Lbs. per Cubic Foot

**Capacity:** 200,000 Lbs. per Hour

**Duty:** 24 Hours per Day, 7 Days per Week

### Advantages Provided by KWS

The existing live bottom screw feeder was clearly designed and built for a lighter-duty application. The screw flights were skip welded to the center pipe, using only short welds on each flight. Wood chips and fibers tend to mat together, creating clumps and plugs. These clumps can't discharge easily and often get stuck at the discharge, plugging the live bottom screw feeder. The plugged material would break the skip welds of the flights, stripping the flights off the center pipe and collapsing them down.

As the leader in the industry, KWS has been designing and manufacturing bulk material handling equipment for over 45 years, so the challenges provided by this application are nothing new. An experienced engineer from KWS visited the site to review the application and discuss the issues with Solvay operations and maintenance personnel. The live bottom screws were redesigned to prevent failure and ensure long-term operation.



Old, Failed Screw with Weld-In Shafts That Had to Be Cut Off



Existing Silo with 12-Screw Live Bottom Feeder

#### Plant Name and Location

**Solvay Biomass Energy Pellet Plant**  
Quitman, MS



**Design Engineering Manufacturing**

#### KWS Manufacturing

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### Special Features of KWS Design

KWS mounted the screws on larger diameter pipe with heavier wall thickness to minimize deflection and reduce fatigue under load. The thickness of the flights was increased to add longer life and add strength. KWS has the finest weld quality in the industry and the flights were welded to the center pipe with continuous welds on both sides of the flights. Continuous welds ensure that the flights won't rip loose from the pipe. Each screw was straightened in a lathe until both ends registered less than 0.015-inch Total Indicated Runout (TIR).

Originally, the live bottom feeder screws utilized welded-in drive and tail shafts, causing significant maintenance issues. KWS redesigned the screws using CEMA three-bolt couplings that allowed for replacement of individual shafts and screws. This improvement will save the maintenance department many hours of down time in the future.

### Testimonial

*"We were changing out screws on a weekly basis, but the new screws from KWS are much better. The welds are great and the flights are staying on the pipe now."*

- Hop H., Maintenance Manager - Solvay Biomass Energy Pellet Plant



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New KWS Screw is Designed Properly for Harsh Application



Old, Failed Screw with Flights Stripped Off



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