KAMENGO

HOG FUEL BOILER STORAGE AND FEED (2007)

Benson, Minnesota, USA

SUMMARY

KAMENGO FEEDERS:	(8) Kamengo Feeders
BIN STORAGE:	(8) 430 cu-ft bins
POWER:	Kamengo Feeders: (1) 15HP motor Screw Conveyor: (8) 5HP motors
CAPACITY:	1600 cu-ft/hr each
PARTNERS:	EPC: SNC Lavalin Boiler Maker: Foster Wheeler North America

SIMILAR PROJECTS

Hog Fuel Boiler Feed Retrofit (2014)
Tacoma, Washington, USA

Hog Fuel Boiler Feed Retrofit (1994)
Kamloops, British Columbia, Canada

Hog Fuel Boiler Feed Retrofit (1993)
Peace River, British Columbia, Canada

Hog Fuel Storage and Feed Day Bin Retrofit (2007)
Port Townsend, Washington, USA

Hog Fuel Storage and Feed Bin Retrofit (2004)
Bogalusa, Louisiana, USA

Hog Fuel Pile Reclaim (2003)
Kamloops, British Columbia, Canada

SYSTEM OVERVIEW

The Benson, Minnesota installation was for a new boiler. The project is particularly challenging because it's primary fuel is hog fuel (wood waste) mixed with poultry litter. The result is a fuel that is not only fibrous and compactible, but also sticky and corrosive.

There are eight inlets into the boiler, with a Kamengo supplied 430 cu-ft bin, Feeder, screw conveyor and chute with expansion joint for each inlet.

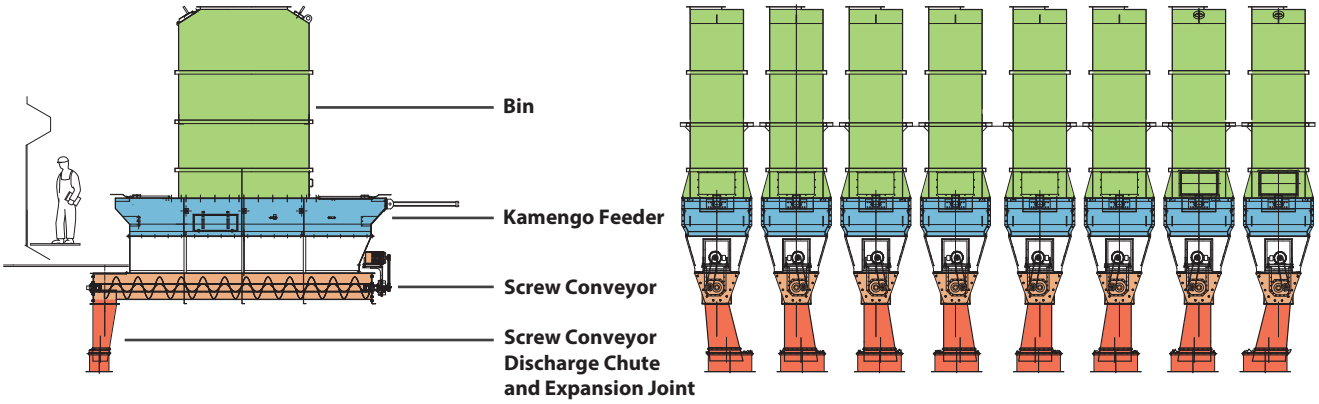
The Kamengo equipment receives fuel from a distribution chain conveyor. Fuel is continuously fed into the first seven bins. Level sensors in the seventh and eighth bin indicate to the plant PLC when to start and stop the distribution conveyor. The even feed from the Kamengo bins permitted the plant to forgo a return conveyor.

The screw conveyor is required because the Kamengo Feeder discharges material across its full length. There is no head of material above the screw auger - in fact the screw trough is never more than 1/3 full and only requires a 5HP drive. As such the screw is only acting as a conveyor and not as a feeder.

Although the screw conveyor introduces an additional mechanical item subject to failure and wear, its inclusion permits a layout that maximizes storage at the boiler.

Kamengo was chosen as the vendor for this project after extensive testing, including feeding the material through our pilot scale Kamengo feeder and bin located in Vancouver, Canada.

SYSTEM LAYOUT



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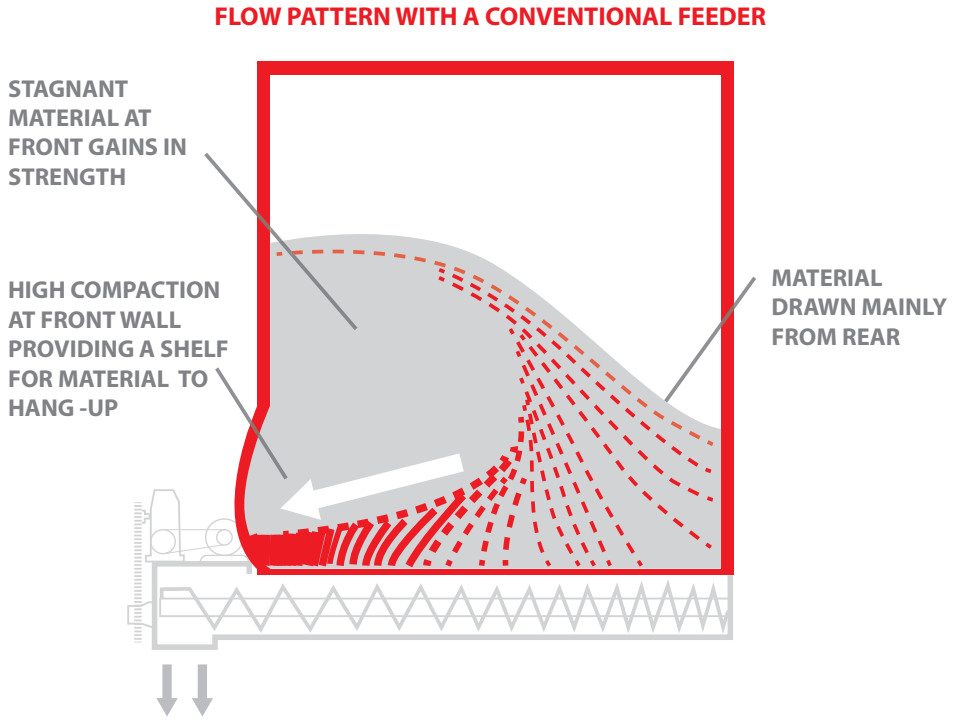
WHY DO CONVENTIONAL FEEDERS PLUG?



WHAT IS HAPPENING INSIDE THE BIN?

Most feeders draw material primarily from the rear of the bin, with little material drawn from the front. This problem is particularly severe when handling low bulk density fibrous materials. With fibrous materials, the pulling action of the feeder is felt well above in the bin, resulting in severe compaction, and in extreme cases, distortion of the front bin wall.

POOR FLOW PATTERN RESULTS IN HANG-UPS

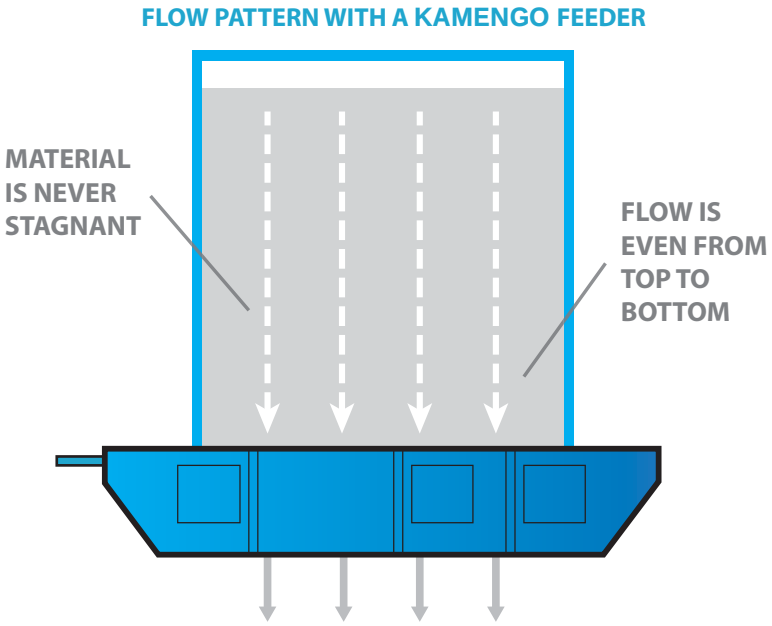
The compacted and stagnant material at the front of the bin is a major cause of bridging and hang-ups. Also, with material drawn mainly from a small section at the rear of the bin, live storage is greatly reduced, and stable rat-holes are permitted to form, resulting in dangerous bin hang-ups.

PUTTING ENERGY TOWARDS THE WRONG PURPOSES

Most feeders withdraw material by developing a shear line at the hopper/feeder interface. This shearing action not only contributes to compaction of the stored material, but also results in excessive wear of mechanical parts.

To learn more about reliable bin and feeder design, visit our website at www.kamengo.com.

HOW IS THE KAMENGO FEEDER DIFFERENT?



The Kamengo Feeder is different because it meters material evenly from the entire hopper outlet. With no stagnant pockets, the stored material is not afforded an opportunity to hang up.

Also, the Kamengo Feeder does not use brute force to extract material out of storage. Instead the Feeder relies on gravity and good bin geometry to reliably discharge the stored material. As such, the Feeder does not compact material, and thus allow it to gain strength and hang up. Also, because the Feeder does not put energy into shearing the material out of the bin, it requires far less power than a conventional feeder, saving energy and minimizing wear.

To learn more about the Kamengo Feeder visit our website at www.kamengo.com.

KEY FEATURES OF THE KAMENGO FEEDER

- FEED EVENLY FROM THE ENTIRE OPENING OF BIN
- FIRST-IN, FIRST-OUT FLOW PATTERN
- NO MATERIAL COMPACTION
- CONSISTENT METERING OF MATERIAL
- NO SHEARING OF MATERIAL
- USE GRAVITY TO DISCHARGE
- LOW POWER LOW WEAR
- FLEXIBLE DESIGN

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KAMENGO SPECIALIZES IN THE STORAGE AND FEED OF DIFFICULT FLOWING BULK MATERIALS

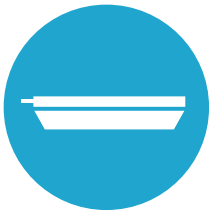
What makes Kamengo different is the tool kit we use to solve complex materials handling challenges:

Equipment To Characterize The Flow Properties Of Fibrous And Cohesive Materials

In the 1980's Kamengo developed new testing equipment capable of characterizing the flow properties of stringy, fibrous and cohesive materials.

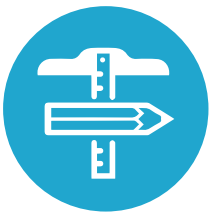
Design Protocols To Determine Correct Bin, Feeder And Chute Geometry

Kamengo has developed design protocols that use a material's flow properties to determine the bin, feeder and chute geometry required to promote reliable material flow. Correct equipment geometry will deny a stored material the conditions it needs to gain in strength and hang-up.



The Kamengo Feeder: Proven Solution For Handling Difficult Flowing Materials

The Kamengo Feeder resolves many of the shortcomings of conventional feeders. The Feeder withdraws material evenly from the full discharge opening of the hopper *and* does not compact stored material, resulting in a fully live bin. With installations running 24/7 for more than 20 years, the Kamengo Feeder has proven that it is a reliable solution for handling difficult flowing materials.



The Kamengo Feeder: A Design Advantage

The flow properties of difficult flowing materials often demand a fully live bin. A fully live bin is very difficult to achieve with a conventional feeder, but is easily achieved with a Kamengo Feeder.

Skilled Design Practice

Over the past 25 years, Kamengo has developed a design practice capable of tackling complex projects, including retrofits of storage and feed arrangements that suffer from plugging. Kamengo has the engineering capability to deliver complete packages of materials handling equipment including storage bins, feeders, chutes, structural work, and conveyors. We have delivered solutions for biomass, ore concentrates, fly and wet bottom ash, wood chips, pellets, and FGD gypsum.

We invite you to explore how Kamengo can apply its specialized tool kit to solve your materials handling challenges.

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