

WETTED FLY ASH STORAGE AND LOAD OUT (1995)

Kamloops, British Columbia, Canada



SUMMARY

KAMENGO FEEDERS: (1) Feeder with loading deck

BIN STORAGE: 4,000 cu-ft

CAPACITY: 3,800 cu-ft/hr

SIMILAR PROJECTS

Fly Ash Storage and Conditioning (1997)
Powell River, British Columbia, Canada

Fly and Bottom Ash Dry Storage and Conditioning (2007)
Rothschild, Wisconsin, USA

Wet Bottom Ash Storage and Feed (2009)
Kogan Creek, Australia

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SYSTEM OVERVIEW

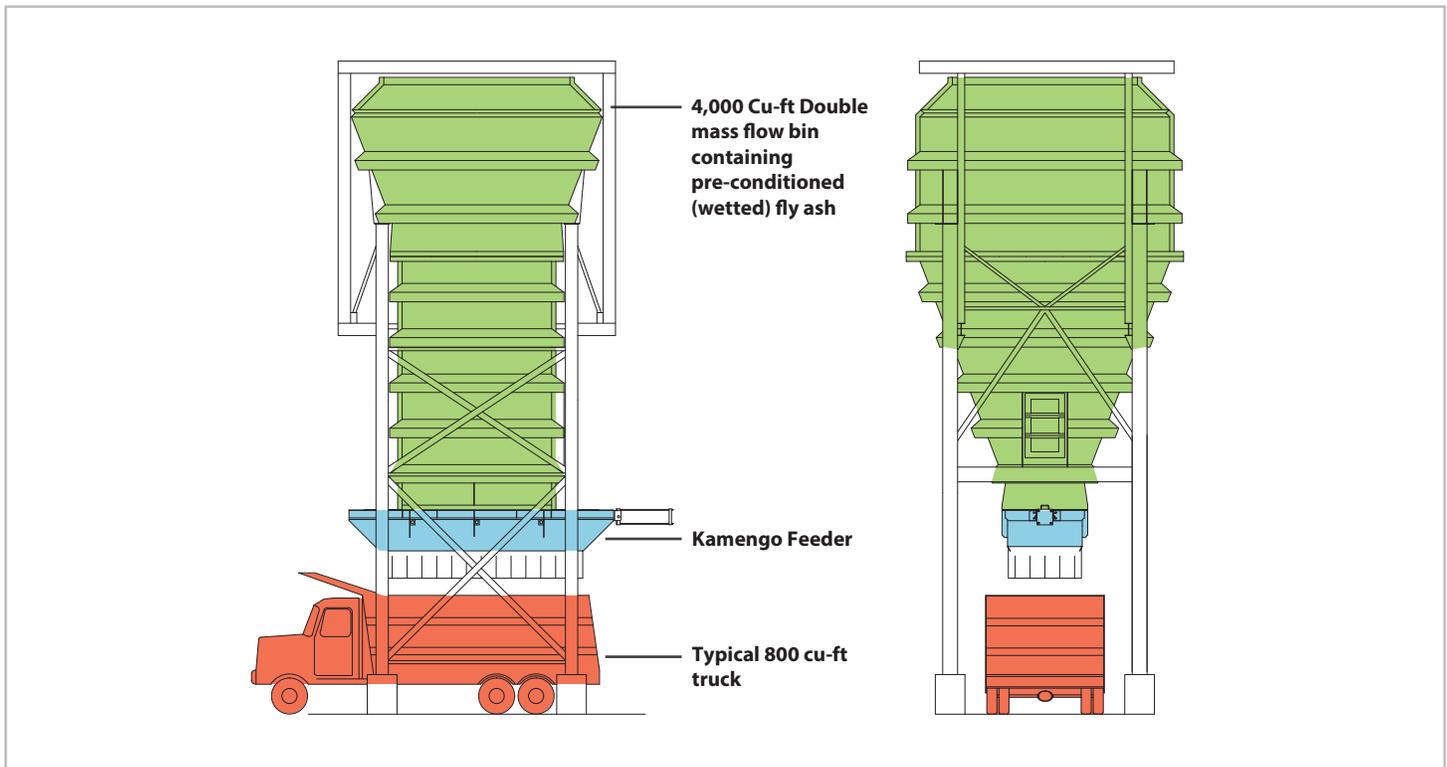
At the Kamloops mill, fly ash that is recovered from the boiler is stored and then transported to a stock pile. Previous to using a Kamengo Feeder, the mill stored the ash in a cylindrical bin with a gate. To suppress dusting, water was added to the ash. But the addition of water only caused the ash to clog up within the bin, requiring the use of vibrators and even manual dislodgement with long poles to free the ash.

In late 1995, the mill, having had success using Kamengo Feeders to feed hog fuel into its boiler, chose to replace its two ash storage bins with a Kamengo Feeder below a new 4,000 cu-ft double mass flow bin. The ash would be conditioned as it is deposited in the bin, and thus be stored safely without risk of explosion, and be discharged without extra effort to wet the material. From the Kamengo bin, the ash would be discharged onto a truck or into a rail car.

A number of flow tests were done to characterize the material under a range of moisture contents, to determine critical bin parameters to avoid bridging and “rat-holing” of material. Simple flow tests were first done over a range of moisture contents to determine the “worst case” moisture content for material flow. As expected, the ash was easy flowing when dry and became more difficult flowing as it became wetter. The bin and feeder is designed to handle the worst case flow characteristics of the ash as occasionally, the ash could be wetted excessively from malfunction of the conditioning system.

The new feeder and mass flow bin were well received by operators. The Feeder was simple to operate: with one button the operator could fill his bed with an even load without moving his truck.

SYSTEM LAYOUT



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HANDLING ASH WITH MINIMUM WATER

An alternative to handling ash wet or as a slurry is to store it dry and only condition it (wet it down) as it is discharged into a truck or rail car. This concept is advantageous for those plants that are keen to minimize the use of water.

Conditioning ash using a Kamengo Ash Feeder offers several advantages:

No over- or under-watering of ash: The Kamengo Ash Feeder is fitted with small spray nozzles that hit each stream of ash flowing from the feeder with a mist of water. The stream of feed from the Kamengo Feeder is consistent, and as such the rate of water can be fine-tuned appropriately.

Dust-free loading: A Kamengo Ash Feeder is fitted with a load-out deck that drops on top of and seals against a truck or rail car container. The load out uses an annular filter and creates a negative vacuum seal to suppress dusting from displaced air.

A dry ash handling system with conditioning upon discharge was first used by Kamengo in 2005 for a pulp and paper mill in Rothschild, Wisconsin.



View of ash feeder from below



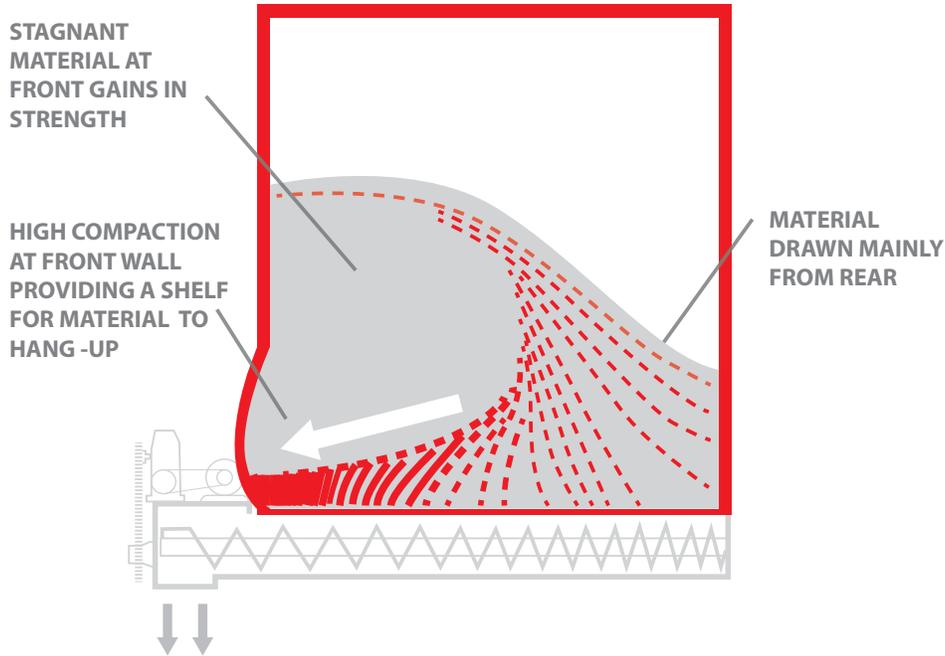
Loading deck below Kamengo Feeder

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WHY DO CONVENTIONAL FEEDERS PLUG?

FLOW PATTERN WITH A CONVENTIONAL FEEDER



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

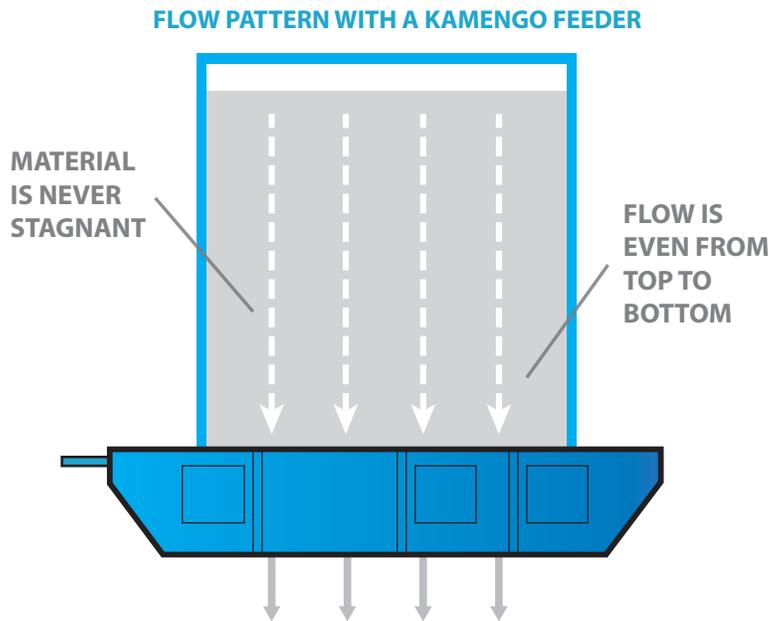
The compacted and stagnant material at the front of the bin is a major cause of bridging and hang-ups. Also, with material drawn mainly from a small section at the rear of the bin, live storage is greatly reduced, and stable rat-holes are permitted to form, resulting in dangerous bin hang-ups.

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?

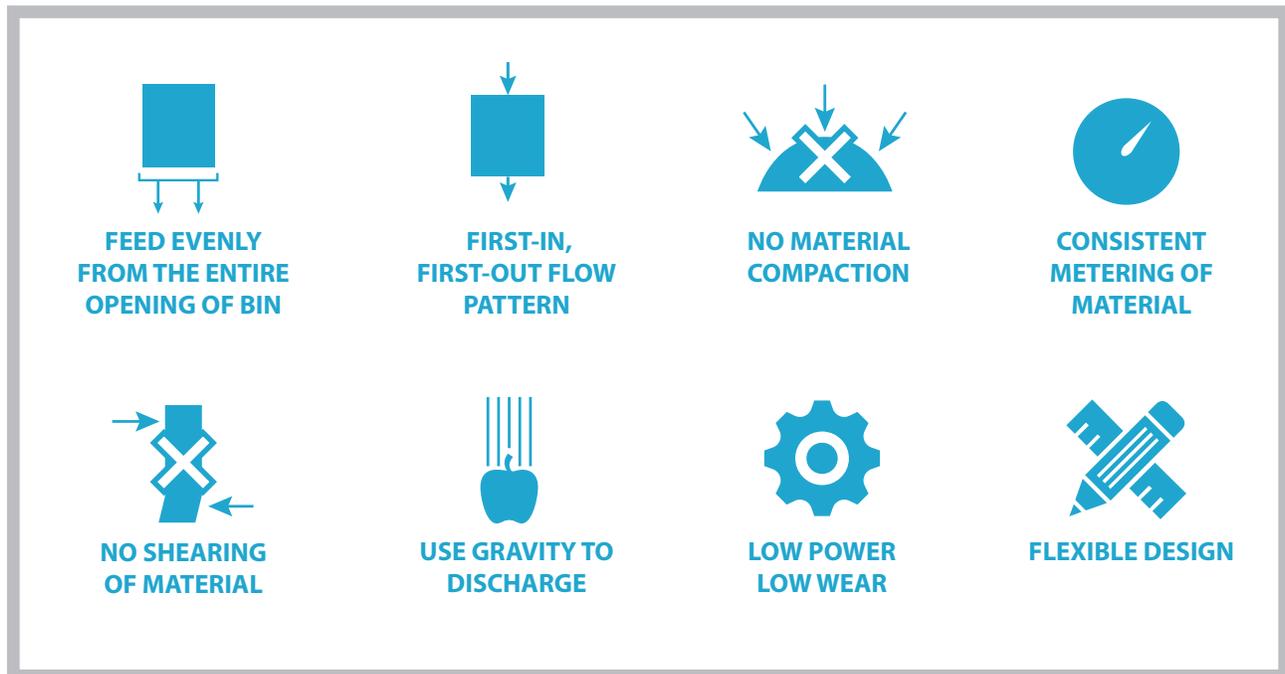


The Kamengo Feeder is different because it meters material evenly from the entire hopper outlet. With no stagnant pockets, the stored material is not afforded an opportunity to hang up.

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.

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KEY FEATURES OF THE KAMENGO FEEDER



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

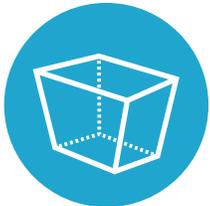


What makes Kamengo different is the tool kit we use to solve complex materials handling challenges:



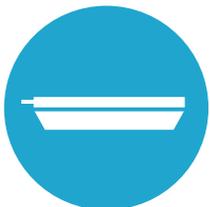
Equipment To Characterize The Flow Properties Of Fibrous And Cohesive Materials

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



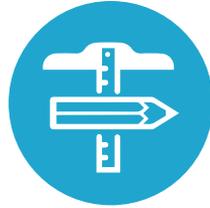
Design Protocols To Determine Correct Bin, Feeder And Chute Geometry

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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www.kamengo.com

E-mail: info@kamengo.com

Tel: (604) 270-9995

1-866-KAMENGO

Fax: (604) 270-9921

Suite 590 - 4400 Hazelbridge Way
Richmond, British Columbia,
Canada V6X 3R8