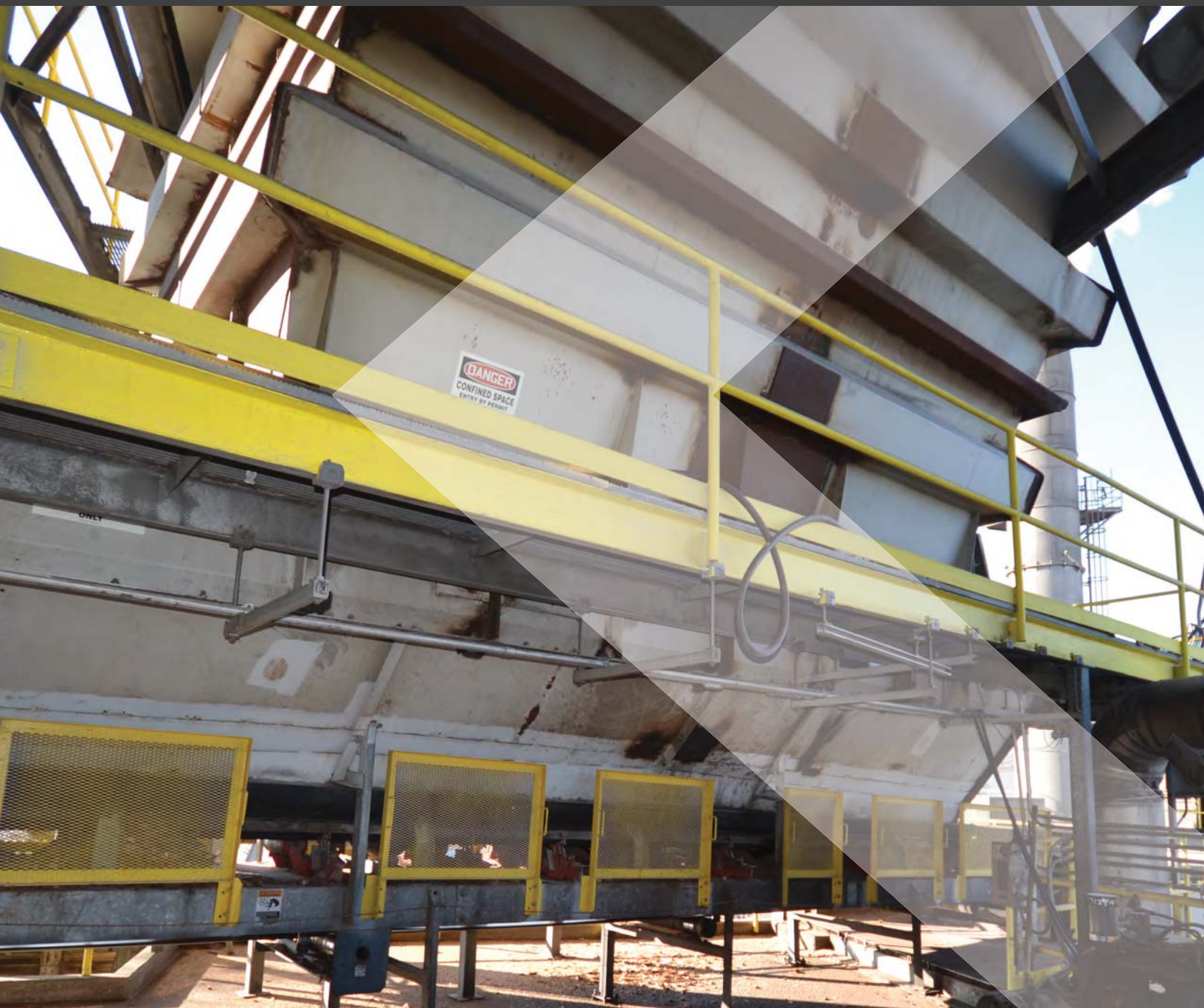
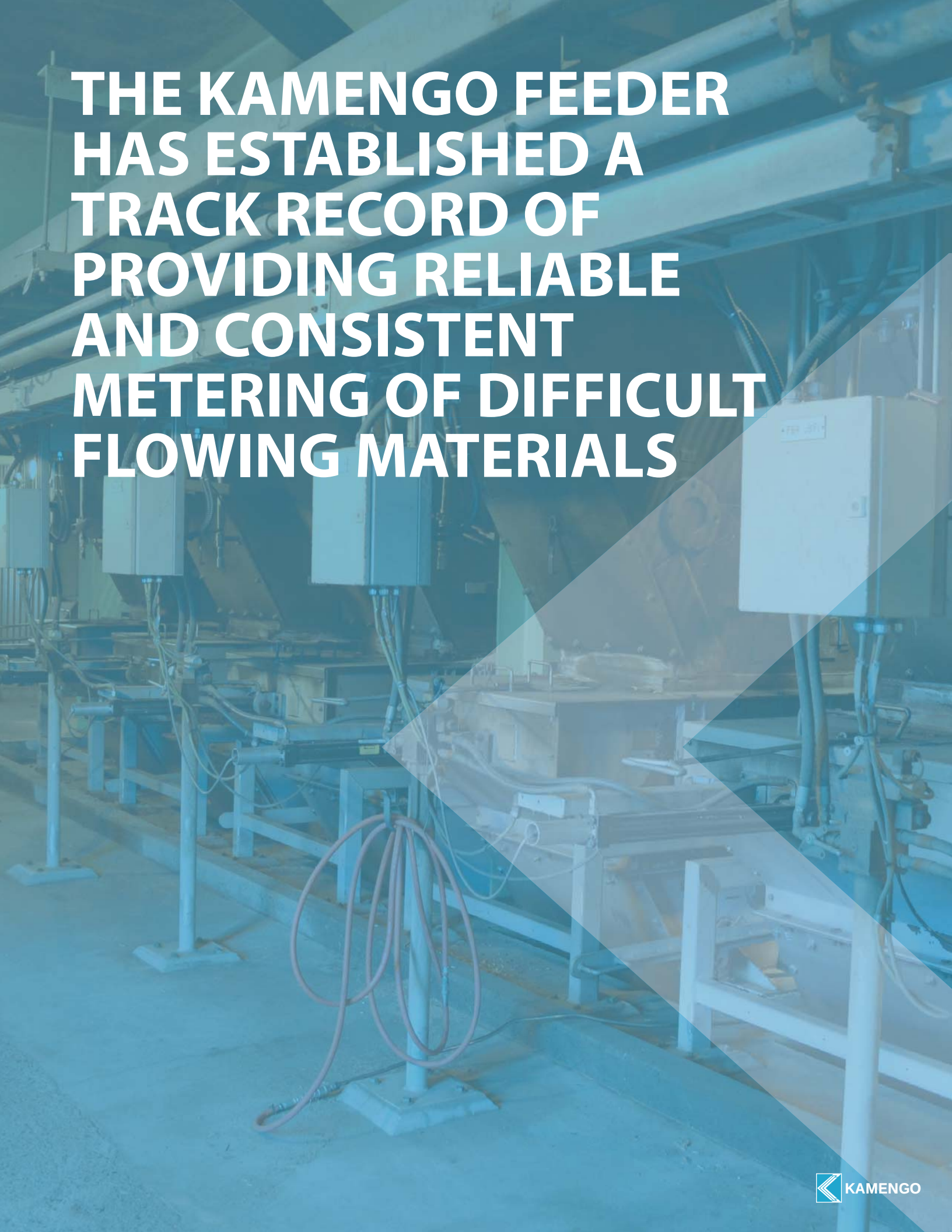
KAMENGO

# THE KAMENGO FEEDER

Designed To Handle Your Most Difficult Flowing Bulk Material





# THE KAMENGO FEEDER HAS ESTABLISHED A TRACK RECORD OF PROVIDING RELIABLE AND CONSISTENT METERING OF DIFFICULT FLOWING MATERIALS

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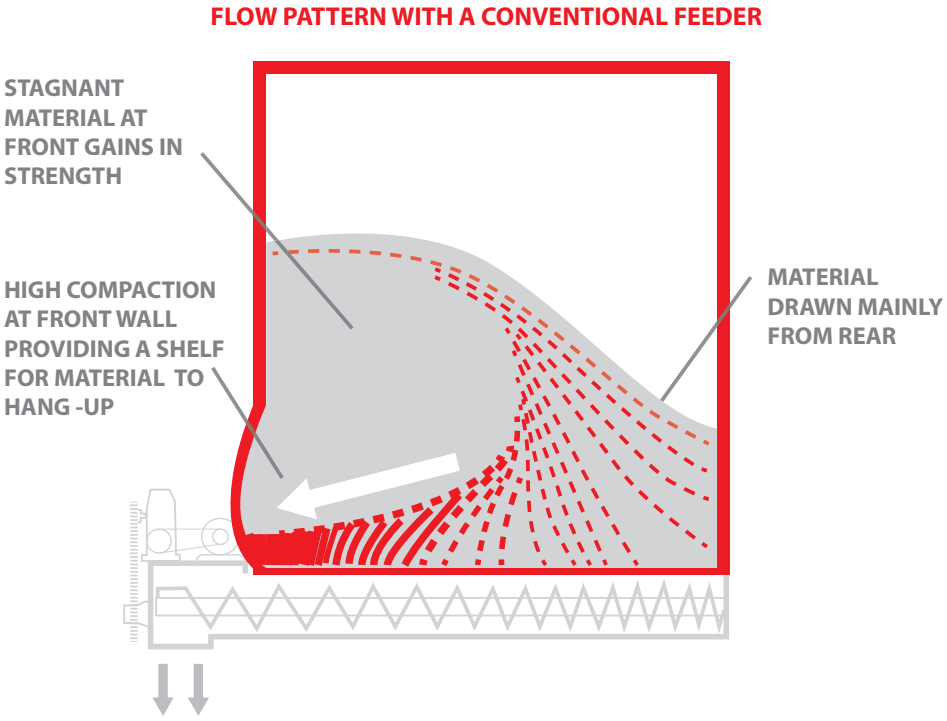
# WHY DO CONVENTIONAL FEEDERS PLUG?




## WHAT IS HAPPENING INSIDE THE BIN?

Most feeders draw material primarily from the rear of the bin, with little material being drawn from the front. The problem is particularly severe with low bulk density fibrous materials. The effect of the feeder is felt well above into the bin, leading to severe compaction, and in extreme cases, distortion of the front bin wall.

## POOR FLOW PATTERN RESULTS IN HANG-UPS

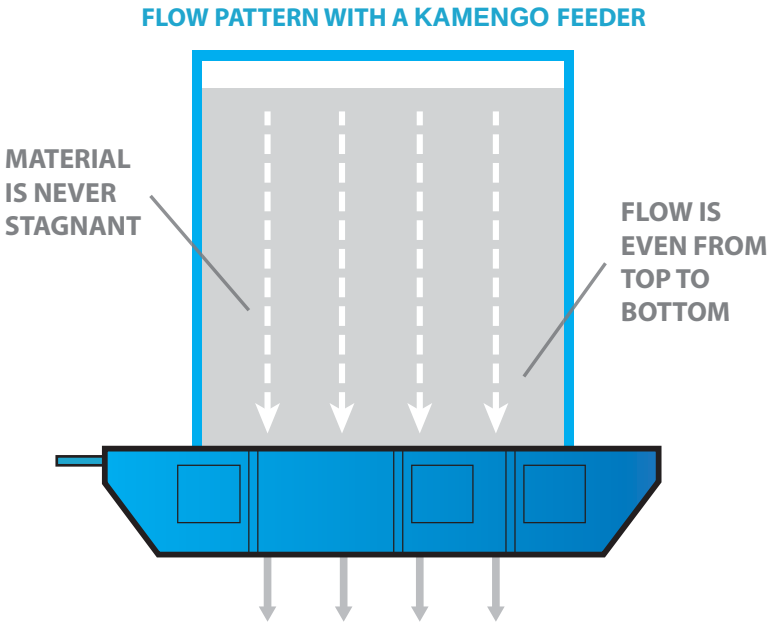
The compacted and stagnant material at the front of the bin is a major cause of bridging and hang-ups. Also, with material drawn mainly from a small section at the rear, stable rat-holes can form, resulting in a reduction in live storage.

## 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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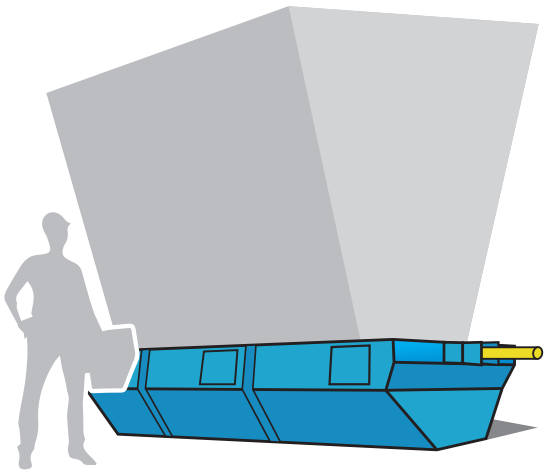
# KEY FEATURES OF THE KAMENGO FEEDER

The Kamengo Feeder consists of a number of slotted openings that traverse back and forth. As the slots traverse the length of the bin, a uniform slice of the stored material is taken from the full bin outlet. The thickness of the slice is controlled by the internal geometry of the feeder. The combination of the thickness of the slice and the speed of the feeder determines the feed rate of the stored material.

Below the moving slots is a metering system that ensures consistent, and predictable flow of material. The metering system also prevents uncontrolled discharge of material when the Feeder is stationary.

To see the Feeder in action, please visit our website at www.kamengo.com.



**FEED EVENLY FROM THE ENTIRE OPENING OF BIN**

**FIRST-IN, FIRST-OUT FLOW PATTERN**

**CONSISTENT METERING OF MATERIAL**

With a mass flow bin above, the Kamengo Feeder will meter material in a first-in, first-out flow pattern irrespective of the length of the storage. To achieve this, the Feeder draws evenly from the entire opening of the bin. A first-in, first-out flow pattern ensures that there are no stagnant pockets of material which can gain in strength and result in bridging in the storage bin above.

**NO SHEARING OF MATERIAL**

**USE GRAVITY TO DISCHARGE**

**NO MATERIAL COMPACTION**

Unlike conventional alternatives, the Kamengo Feeder does not shear material out of the bin. This shearing action compacts the stored material, enabling it to gain in strength and hang up. In contrast, the feeder uses gravity to its advantage to discharge material in a controlled manner. Further, because the Feeder does not put energy into shearing the material out of the bin, it is ideal for material such as pellets that require gentle handling.

## LOW POWER LOW WEAR

The Feeder construction is simple and has few wear points. It can be built with wear surfaces and stainless steel for extra abrasion and/or corrosion resistance. Because the Feeder does not put energy into shearing material out of the bin, it requires far less power than a conventional feeder, saving both energy and exposure to excess wear.

## FLEXIBLE DESIGN

The Feeder can be designed long or short, as well as narrow and wide. This allows the Feeder to be sized to overcome the bridging or rat-holing dimension that a difficult flowing material needs to gain strength and cause a hang-up. The Feeder is able to discharge material at a wide range of capacities.

In service:
- Two self-unloading ships each with nine +100-foot long feeder (4,000 t/hr)
- Two 35-foot long hog fuel reclaim feeders (100 t/hr)
- 6-foot long hog fuel boiler feed feeders (20 t/hr)

The Feeder can also discharge difficult flowing materials from tall bins. In service:
- Feeding hog fuel from a 7,000 cu-ft day-bin
- Feeding wet bottom ash from a 11,000 cu-ft silo.

There are over a hundred Kamengo Feeder units in operation, handling many types of difficult flowing materials, including:

**FIBROUS MATERIAL**

**COHESIVE/STICKY MATERIAL**

**MATERIALS THAT REQUIRE GENTLE HANDLING, SUCH AS PELLETS**

# A SELECTION OF KAMENGO FEEDER APPLICATIONS

## HOG FUEL BOILER STORAGE AND FEED RETROFIT (2014)

Tacoma, Washington, USA

The Tacoma installation originally had five screw feeders that were prone to severe and chronic plugging. As part of the retrofit, they were replaced with five new surge bins and Kamengo Feeders.

## COBALT HYDROXIDE FILTER CAKE STORAGE AND FEED (2011)

Democratic Republic of Congo

A total of four Kamengo Feeders are in operation at the mine site. Two feeders handle wet cobalt hydroxide and two feeders handle dry cobalt hydroxide. The wet and dry cobalt hydroxide are stored in a positive taper mass flow bin. Material testing by Kamengo confirmed the geometry of the bin and feeder to ensure reliable flow.

## SELF-UNLOADING SHIPS (2002)

Various cargo, Winner of Lloyd's List
*"Innovation in On-Board Cargo Handling" Award*

Two ships fitted with Kamengo Feeders went into service in 2002 and 2009. Each ship includes nine 100 foot long feeders. These ships have carried gypsum, coal, iron ore pellets, iron ore fines, granite aggregate, fertilizer, calcite and clinker cement. In 2002, the Kamengo Feeder won the Lloyd's List award for "Innovation in On-board Cargo Handling".

## FRONT-END LOADER SYNTHETIC GYPSUM STORAGE AND FEED (2013)

Fort McMurray, Alberta, Canada

In 1997 Kamengo conducted flow characterization tests of FGD gypsum to determine critical design parameters for a bin and feeder to be used in outdoor artic conditions. In 2012, Kamengo was selected to deliver this installation, which includes a feeder, hopper and grizzly, 140-foot belt conveyor, crusher, transfer tower, and screw conveyor. Kamengo has also supplied a duplicate set-up of equipment for a sister plant, also in Fort McMurray.

## SILO RECLAIM CANOLA PELLETS STORAGE AND FEED (2009)

Yorkton, Saskatchewan, Canada

Kamengo delivered three 37-foot long feeders, each feeding canola pellets from a 130-foot high, 42-foot diameter silo. The Kamengo Feeder was chosen because it is very gentle at handling pellets. In contrast to conventional reclaim feeders, the Kamengo Feeder can reclaim pellets from long piles at high capacities without damaging the pellets.

## DRY FLY & BOTTOM ASH STORAGE, CONDITIONING, AND LOAD OUT (2005)

Rothschild, Wisconsin, USA

The Rothschild installation stores a mix of dry fly ash and bottom ash in a 6,000 cu-ft bin. To minimize water consumption, the ash is only conditioned as it is loaded into a truck. The bottom of the Kamengo Feeder is fitted with a load out deck that drops on top of the truck container, providing a vacuum seal to suppress dusting.

# 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

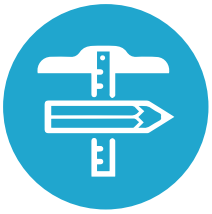
In the 1980's Kamengo developed new testing equipment capable of characterizing the flow properties of stringy, fibrous and cohesive materials.

## 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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