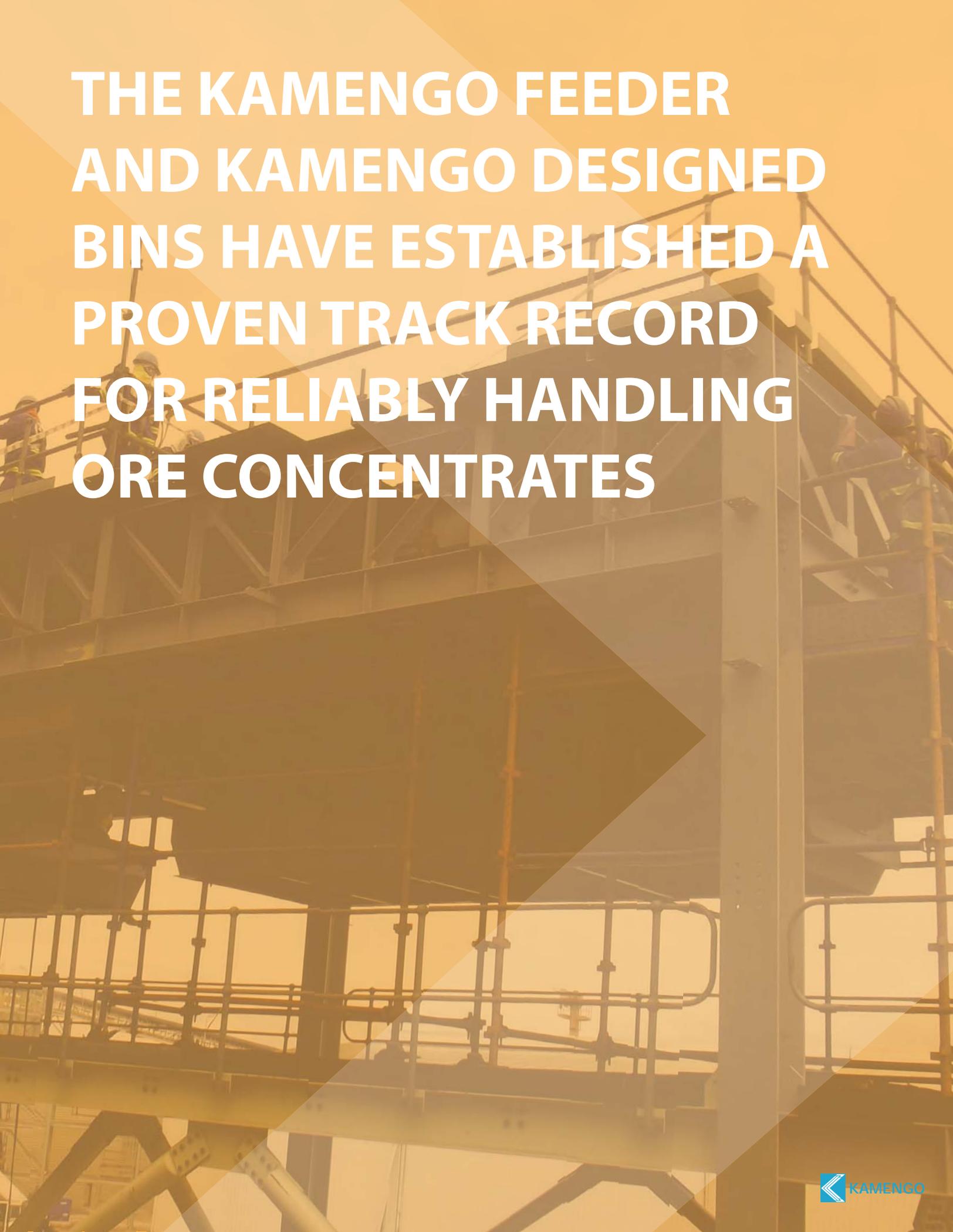


Solutions for Storing and Feeding

# ORE CONCENTRATE





**THE KAMENGO FEEDER  
AND KAMENGO DESIGNED  
BINS HAVE ESTABLISHED A  
PROVEN TRACK RECORD  
FOR RELIABLY HANDLING  
ORE CONCENTRATES**



**Ore concentrates can be very sticky and cohesive, particularly when wet. Poor bin and feeder design will lead to permanent, chronic bridging and plugging when handling particularly difficult flowing materials.**

## **WORKING WITH ORE CONCENTRATE**

Ore concentrates can be a very sticky, cohesive material, and particularly difficult to handle when wet. When compacted, concentrates can gain in strength. The net result is a material that is unforgiving, where poor bin and feeder design will lead to permanent, chronic bridging and plugging.

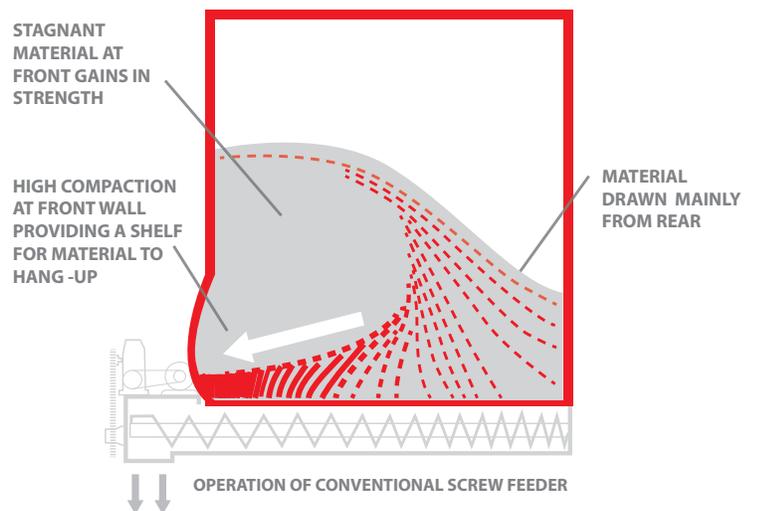
## **KAMENGO'S SCIENCE-BASED APPROACH**

Starting in the early 1980s, Kamengo led an R&D effort to characterize the flow properties of fibrous and cohesive materials. Kamengo built on the work of Jenike & Johanson, who pioneered the theory and testing procedures for characterizing granular and small particle material, as well as the work of the UK coal board that extended J&J's work to develop new testing equipment to characterize large particle materials.

**DIFFICULT FLOWING  
MATERIAL SUCH AS  
ORE CONCENTRATES  
REQUIRE A TRULY  
MASS FLOW FEEDER  
THAT NOT ONLY  
WITHDRAWS  
MATERIAL EVENLY  
FROM THE FULL BIN  
OUTLET, BUT ALSO  
DOES NOT COMPACT  
THE MATERIAL**

## BIN DESIGN FOR STICKY MATERIAL

The solution for getting sticky cohesive materials to flow reliably is to first understand the conditions that allow the material to gain in strength and bridge, and then design a feeder and bin that consistently denies the stored material these conditions. Kamengo has been applying this principle successfully in designing equipment for sticky cohesive materials – starting with synthetic and recycled gypsum – since the 1990s. Kamengo has delivered equipment to handle rock phosphate as well as moist and dry cobalt-hydroxide filter cake.



## WHY DO CONVENTIONAL FEEDERS KEEP PLUGGING?

Kamengo's research produced critical insights on bin and feeder design for difficult flowing cohesive, sticky materials. In particular, Kamengo's team made important observations to understand why conventional feeders such as screw feeders and apron feeders are often plagued by chronic plugging.

The team understood that difficult flowing material such as ore concentrate requires a truly mass flow feeder that not only withdraws material evenly from the full bin outlet, but also does not compact the material. This led the team to design the Kamengo Feeder which is capable of discharging difficult flowing sticky/cohesive material, such as ore concentrates, in a first-in, first-out flow pattern, and doing so without compacting the material – a key to reliable material flow.

# THE KAMENGO FEEDER HAS BEEN RELIED UPON FOR HANDLING NUMEROUS ORE CONCENTRATE PROJECTS





Recycled Gypsum storage and feed



Self-unloading ship



Dry gypsum loadout, storage and feed

## A SELECTION OF KAMENGO'S ORE CONCENTRATE PROJECTS

**Recycled Gypsum Storage and Feed (1994)**  
Vancouver, British Columbia, Canada

**Recycled Gypsum Storage and Feed (1996)**  
Winnipeg, Manitoba, Canada

**Rock Phosphate Storage and Feed**  
Edmonton, Alberta, Canada

**Synthetic Gypsum Storage and Feed (2009)**  
Fort McMurray, Alberta, Canada

**WHAT MAKES KAMENGO  
DIFFERENT IS THE TOOL  
KIT WE HAVE AT OUR  
DISPOSAL TO SOLVE  
COMPLEX MATERIALS  
HANDLING CHALLENGES**

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

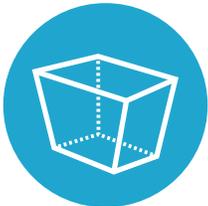


What makes Kamengo different is the tool kit we use to solve complex materials handling challenges:



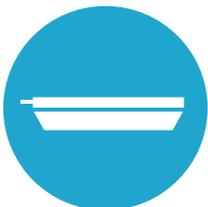
**Equipment To Characterize The Flow Properties Of Fibrous And Cohesive Materials**

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



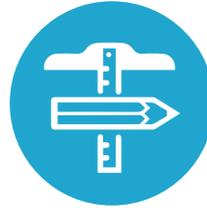
**Design Protocols To Determine Correct Bin, Feeder And Chute Geometry**

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 Bulk 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.**