

# Improved Resource Efficiency Through Dynamic Loading Control

## Project team (LTU);

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**LKAB**

**ABB**

**MIN**

**BOLIDEN**

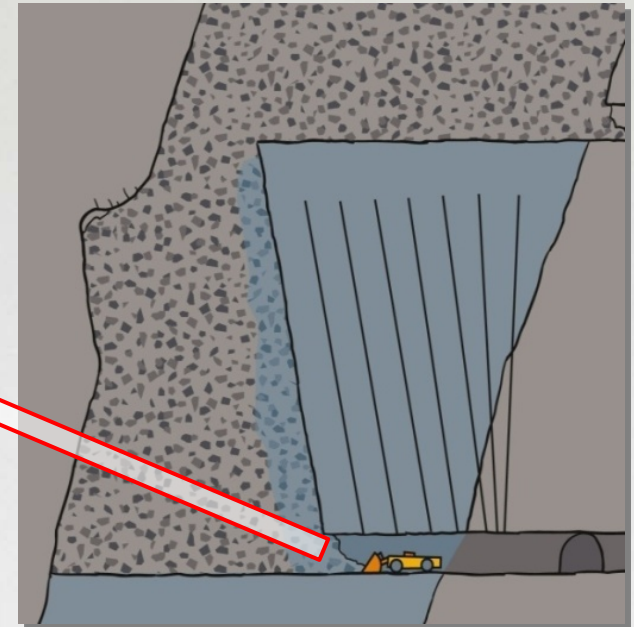
**agio**



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# Introduction to sublevel caving

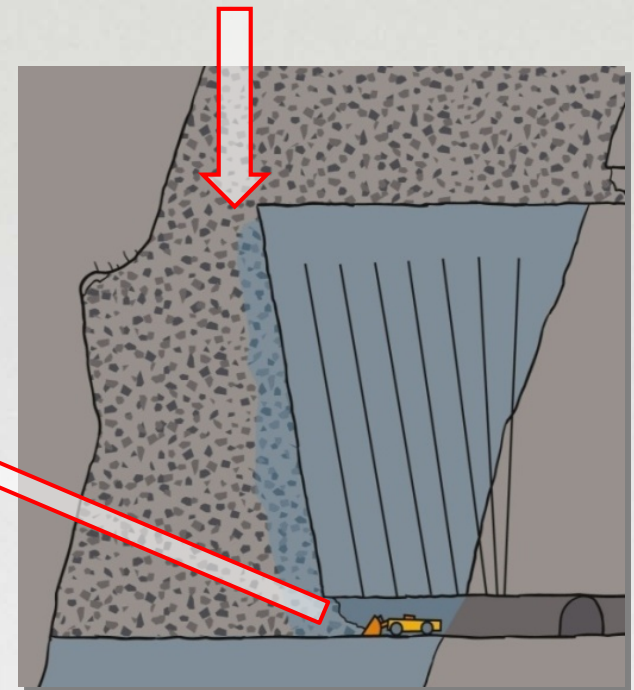


Courtesy of LKAB

# Introduction to sublevel caving



Continuous mixing  
of ore and waste



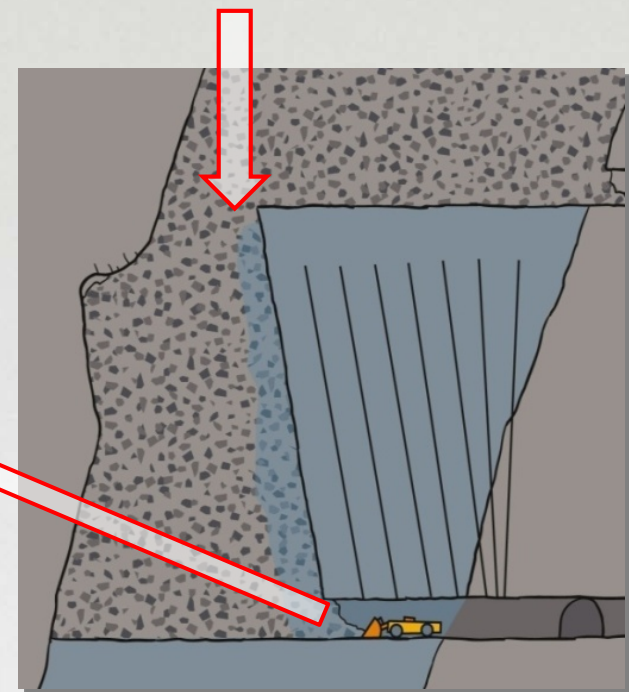
Courtesy of LKAB

# Introduction to sublevel caving



Flow of material from a restricted opening

Continuous mixing of ore and waste



Courtesy of LKAB

**Draw control  
regulates  
loading process**



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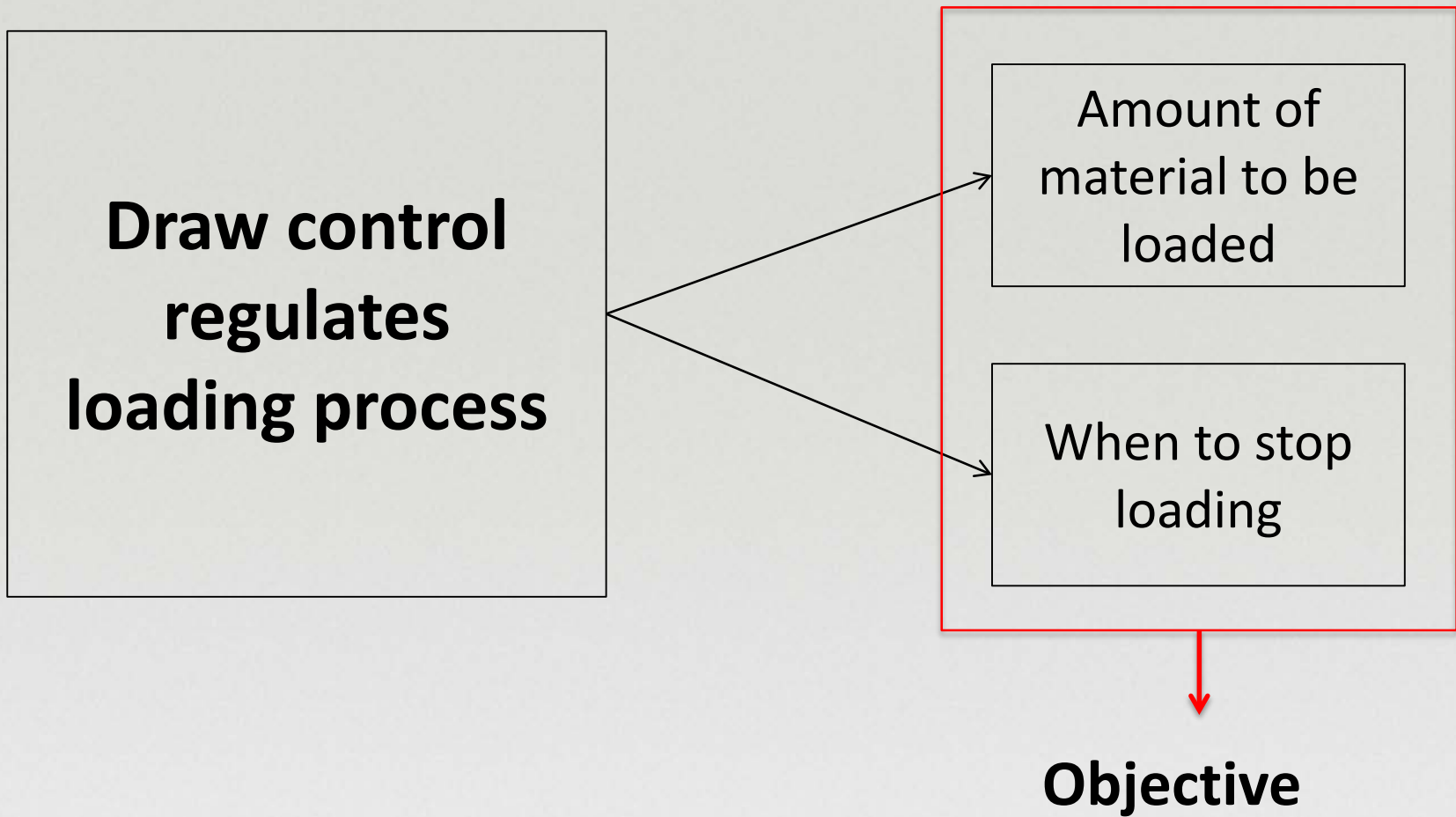
**Draw control  
regulates  
loading process**

Amount of  
material to be  
loaded

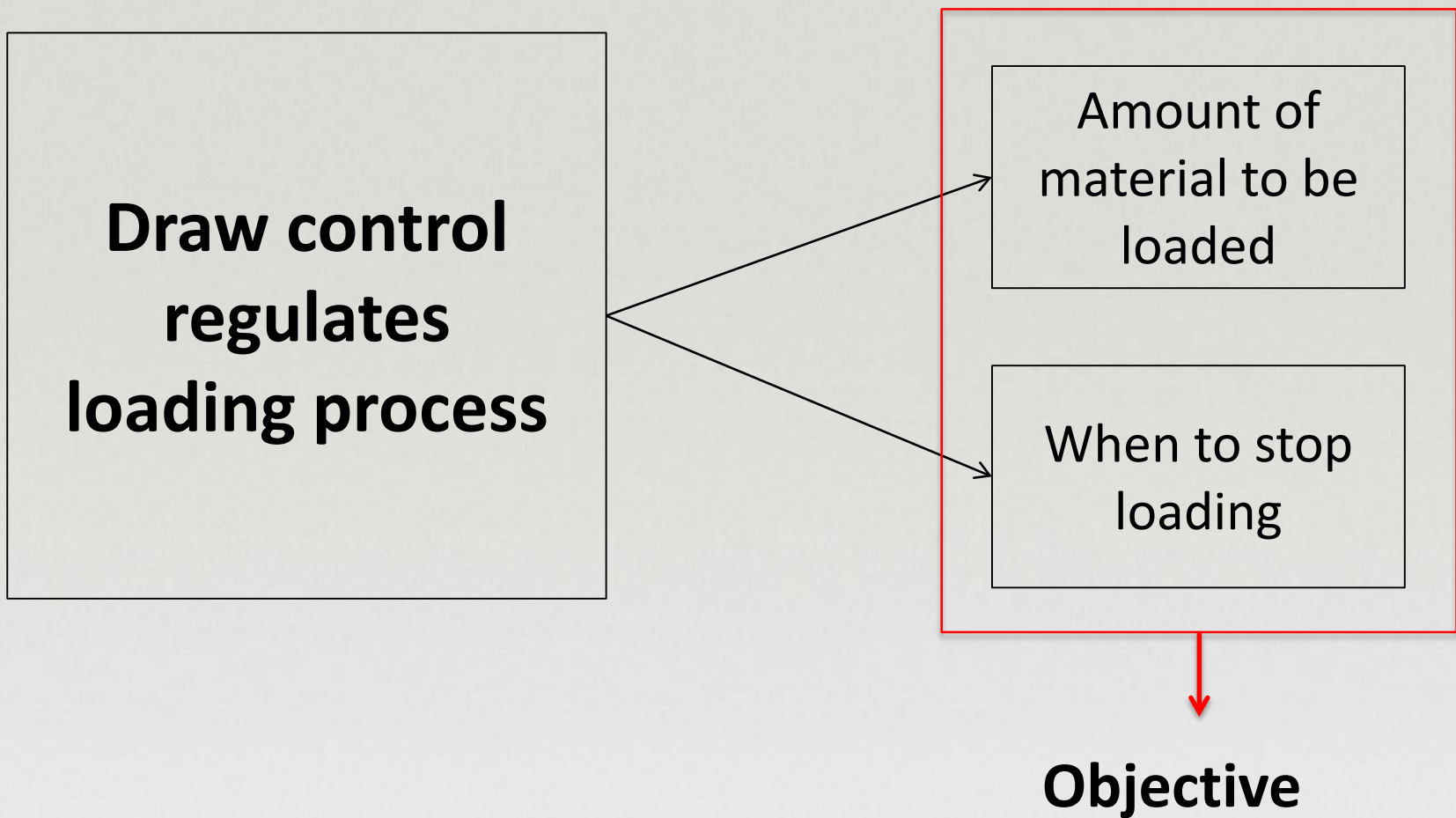
**Draw control  
regulates  
loading process**

Amount of  
material to be  
loaded

When to stop  
loading

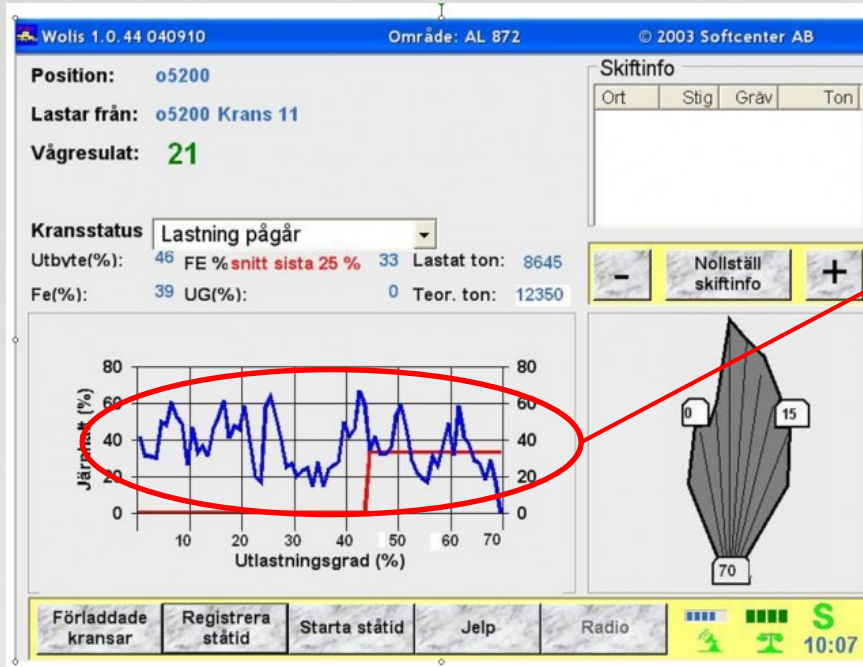






**Purpose:** Increase ore recovery  
Reduce dilution and mining costs

# Information system at LKAB



Ore grade plotted against extraction ratio



# Project overview

Probabilistic mixing model

Rings simulation from the model

Testing loading criteria's

Integration with an economic model

Mine tests

# Project overview

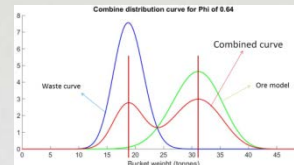
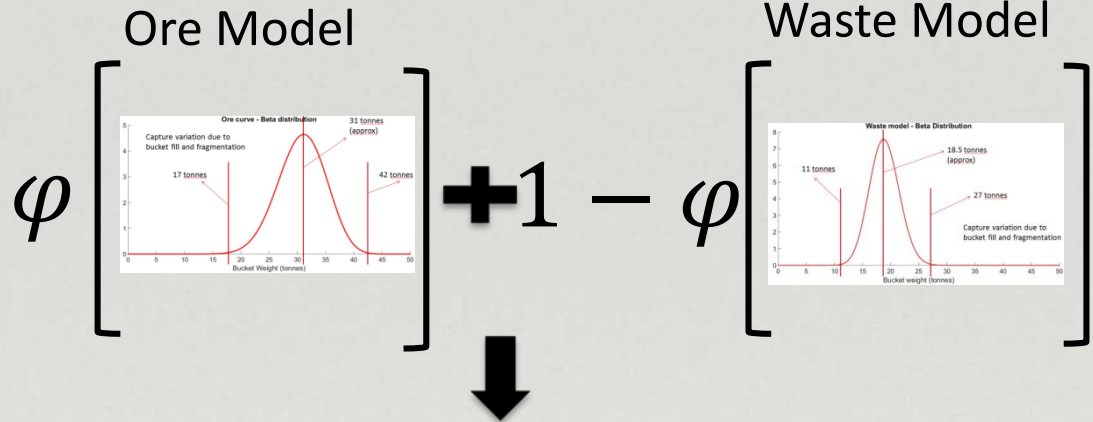
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Combined model

Make Phi ( $\varphi$ ) parametric to mining conditions

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Aim:

To check the models ability to simulate different kinds of ring behaviour

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Aim:

- Test the impact of present loading criteria on entire mine scenario's
- Test other types of performance based successive loading criteria's

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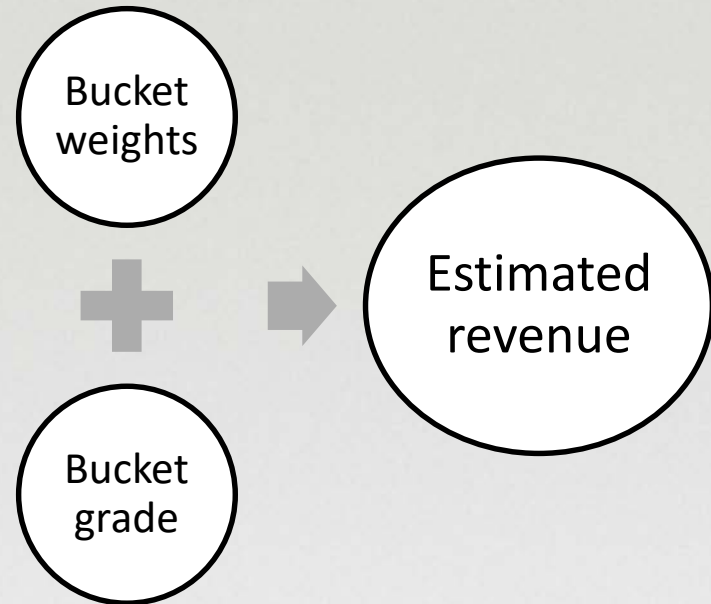
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\*\* Assumptions of mass balance and grade estimation

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- Model integration starts in Q4
- Mine test will be performed
- Model to be integrated with the present system



# Tack



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