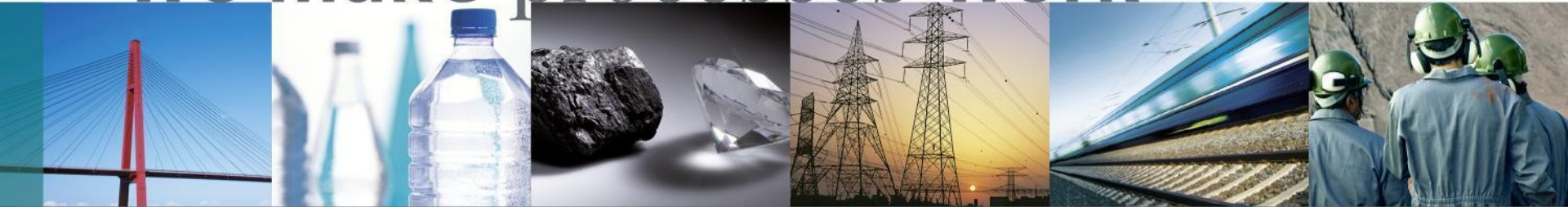


# we make processes work



## Schenck Process Group

Global solution for Solid Wastes Alternative Fuel feeding system

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**5**

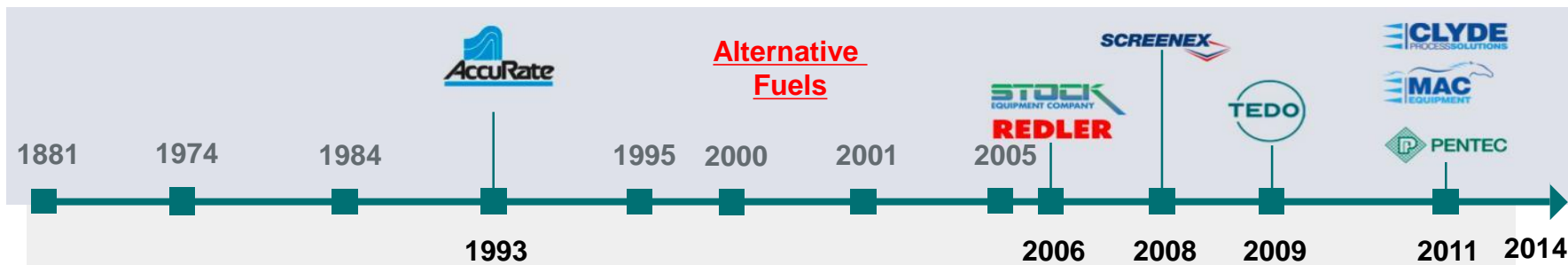
**Conveying systems**

**6**

**Weighing & Feeding near to Kiln burner & Precalciner**



# From Global Experience to Local Activities



**5 Continents**

**32 National Companies  
(Legal Entities)**

**22 State-of-the-art assembly  
facilities worldwide**

**> 130 Territorial Agencies**



Having hundreds of different successful installation worldwide can give an overview of the Schenck Process capabilities and flexibilities.

Thinking globally, acting locally !

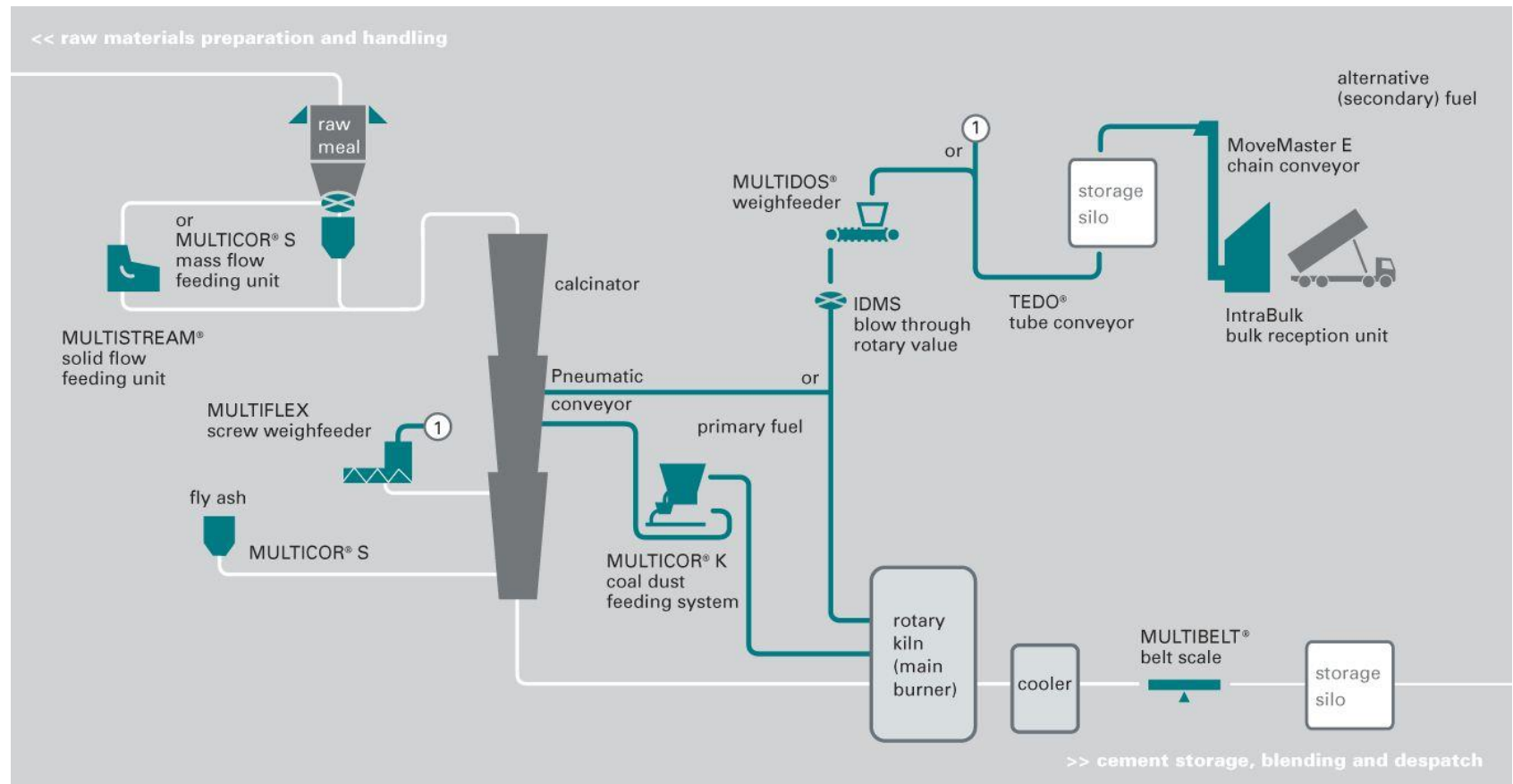
2

**Sustainable Cement Production – Alternative Fuels**




# Cement Plant Schematic: Alternative Fuel Feeding Systems

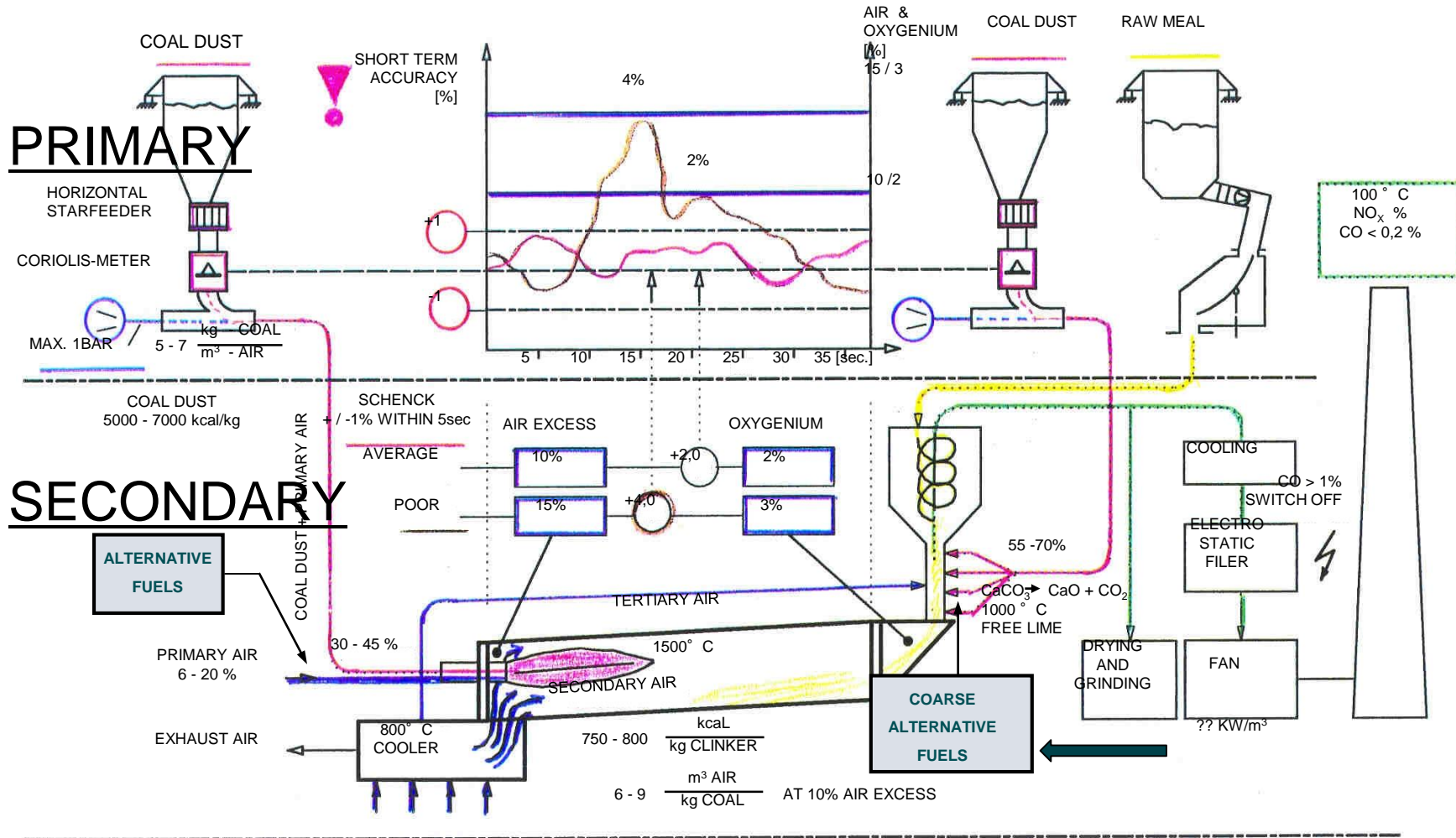
## Calciner and Kiln Feeding



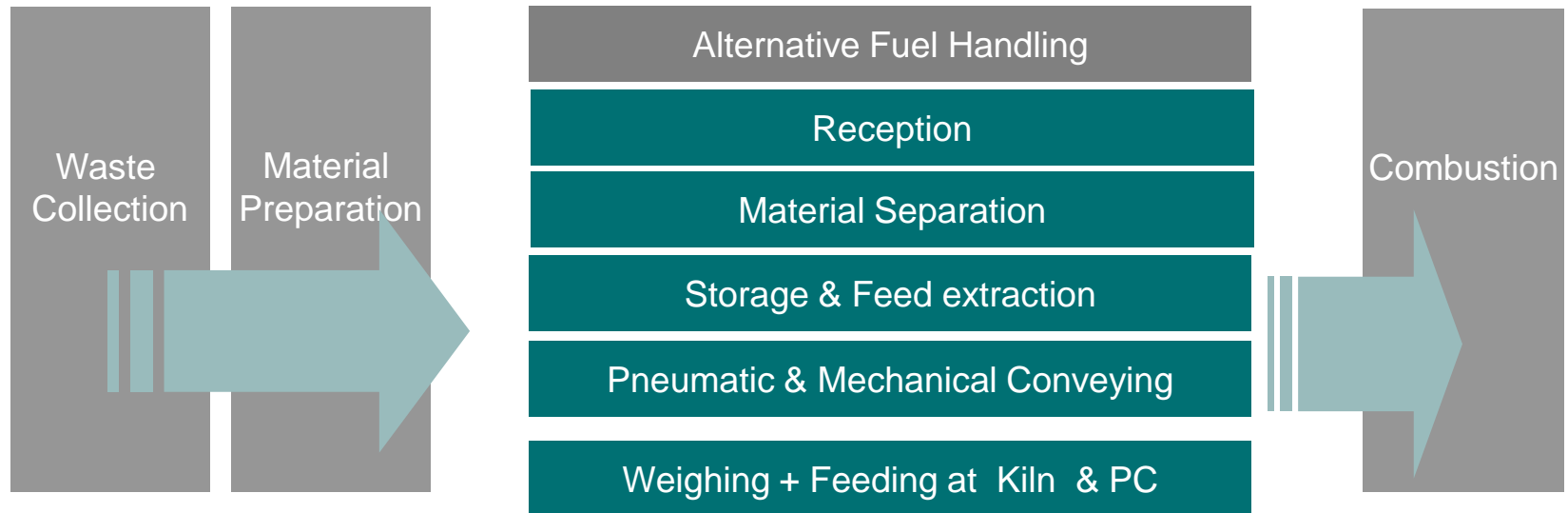
**Legend:**

 Process step covered by the Schenck Process Group

# FUEL FEEDING AT CEMENT KILNS



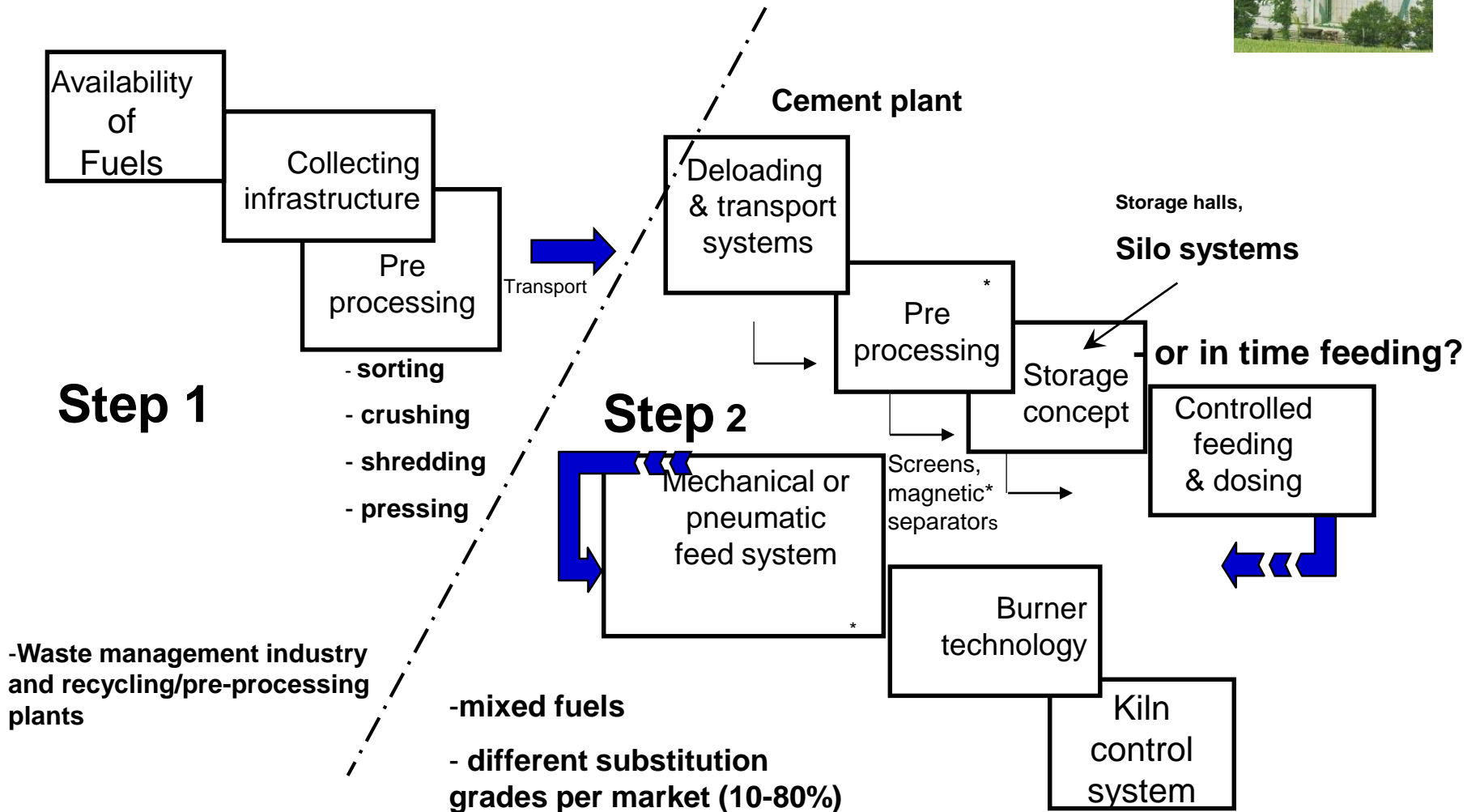
## Use of Alternative Fuels in Cement Production: Process Steps







# Process Steps for the handling & processing of alternative fuels





## Alternative Fuel Feeding Systems: Key Characteristics Embraced by Schenck Process

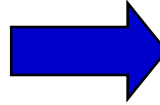
Typical Design Data & Material Properties:	
<b>Materials</b>	Solid shredded wastes, bio mass, etc.
<b>Feed rate</b>	Up to 200m <sup>3</sup> /hr, max. 20 t/hr
<b>Accuracy</b>	±1 % within a range of 1:10
<b>Grain size</b>	Main burner: 0 – 35mm, max. 50mm, Calciner: 0 – 150 mm, max. 200mm
<b>Bulk density</b>	0.05 – 0.8 t/m <sup>3</sup>
<b>Moisture</b>	Max. 20 ~25 %
<b>Material flow properties</b>	Slightly sluggish, tending to bridging

- Shredded plastics / RDF
- Foil chips
- Conditioned sewage sludge
- Wood chips & saw meal
- Shredded tyres
- Paint Sludge
- Rice husk
- Carbon Black
- Mixtures of the above



## Secondary Fuel - Examples

- Tires, shredded rubber
- Plastic-Shredder
- Paint dust/ Sludge
- Conditioned sewage sludge
- Wood chips & saw meal
- Organics like
  - Palm kernel shells
  - Domestic MSW / BRAM
- Secondary fuels of commercial production waste, containing materials such as:
  - packing materials & cardboard
  - Photographic film and celluloid waste
  - Polystyrol foam waste
  - Douroplasts
  - Plastic boxes and containers
  - Paper, cardboard, production residue from the paper manufacturing process
  - Fabric and pulp materials
  - Carpet shredder
- Mixtures of above



## SECONDARY FUELS - EXAMPLES



**Solid waste out of production process foil chips**

grain size : 1-50 mm  
 heat value : 22 MJ/kg  
 bulk density : 0,08 t/m<sup>3</sup>



**BPG solid fuel out of industrial waste**

grain size : 1-30 mm  
 heat value : 22 MJ/kg  
 bulk density: 0,2 t/m<sup>3</sup>



**BRAM solid fuel out of garbage assorted household waste**

grain size : 1-50 mm  
 heat value : 22 MJ/kg  
 bulk density: 0,1 t/m<sup>3</sup>



**Meat and bone meal**

grain size : 1-5 mm  
 fat content : 12-15 %  
 heat value : 12-15 MJ/kg  
 bulk density: 0,7 t/m<sup>3</sup>

# What volumes of Secondary Fuel has to be handled? (Example)



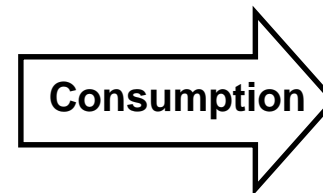
**Primary Fuel**

Coal and petcoke: **10 t/hour**

**Co processing  
with  
Secondary Fuel**

Feed rate : ~ **5 t/hour**  
Bulk density : 0,1-0,2 t/m<sup>3</sup>  
Flow rate, like Plastic waste : ~ 25m<sup>3</sup>/h

## Secondary Fuel



**600 m<sup>3</sup> / day  
to  
1200 m<sup>3</sup> / day**

by  
50%  
Substitution  
ratio

## Alternative Fuel co-processing

### THE TARGET



- ➔ decreasing operational costs on cement kilns by substitution of high priced Primary Fuels (coal, petcoke, gas) with low priced Alternative (or Secondary) Fuels
- with controlled impact on clinker quality, production capacity, kiln system stability and emission levels.

**3**

**Alternative Fuel Handling System - Applications**







Reception



Storage



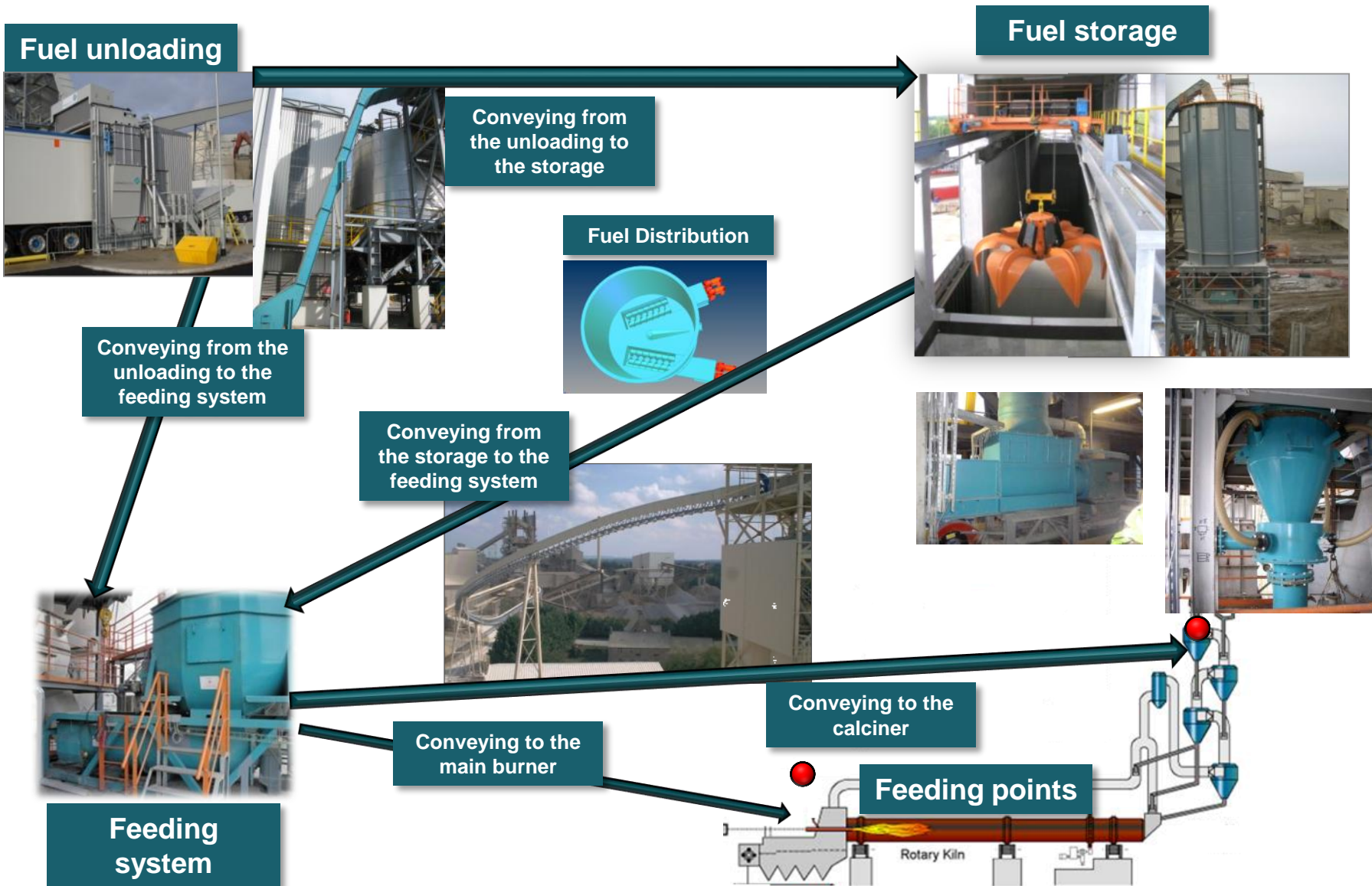
Conveying



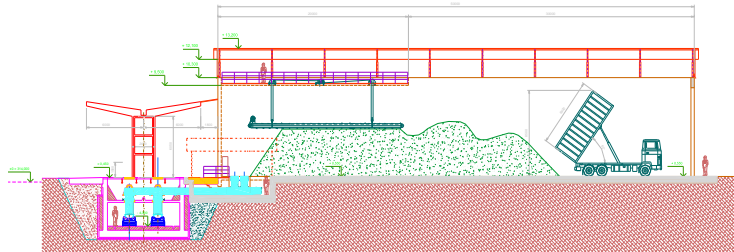
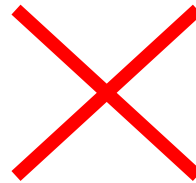
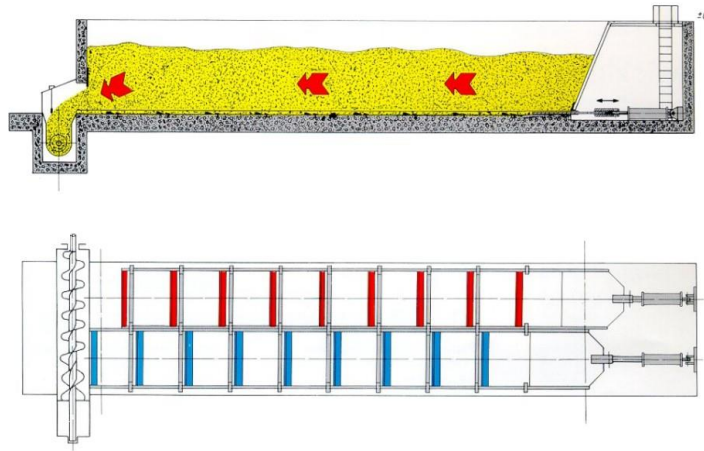
Feeding



# Example of AF equipment and its position in a cement plant



# Storage or „Just in Time“?





## Customer Example III

RDF and Biomass reception, conveying and feeding



## Schenck Process and experience for turn key jobs: Ozarow - Poland

### MILESTONES

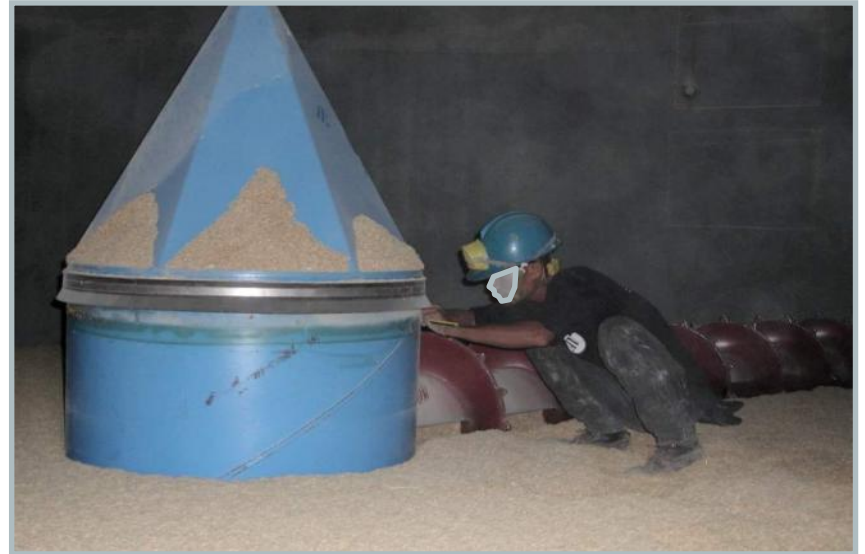
- JANUARY 2010 – START
- MARCH 2010 – BUILDING PERMISSION DESIGN
- MAY 2010 – START OF CIVIL WORKS
- OCTOBER 2010 – COLD START-UP
- JANUARY 2011 – CAPACITY TESTS





# Storing alternative fuels in silos

## Silo extraction screw



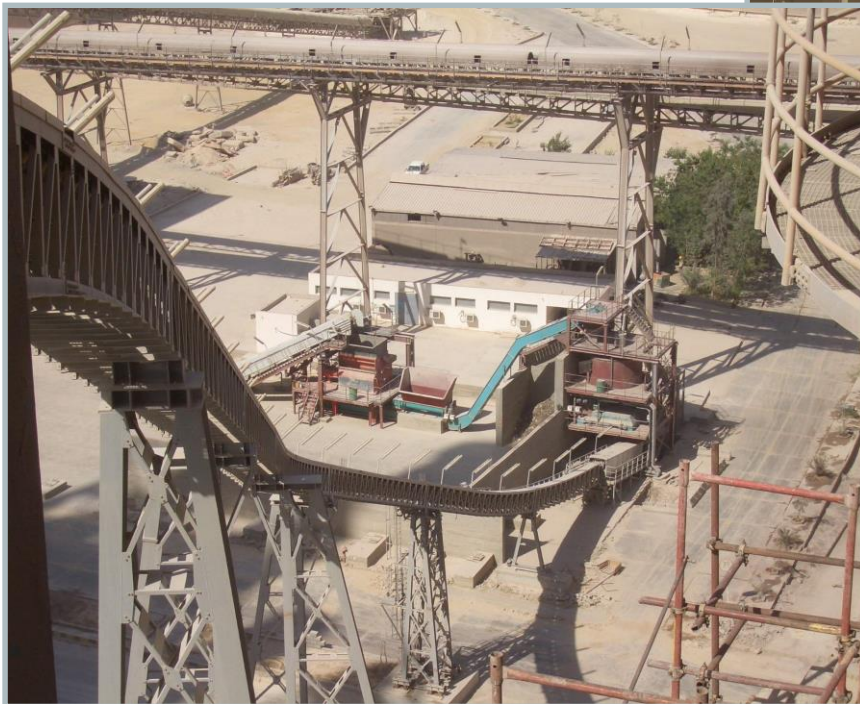
4

Customer Examples



## Customer Example II

RDF feeding and conveying to calciner





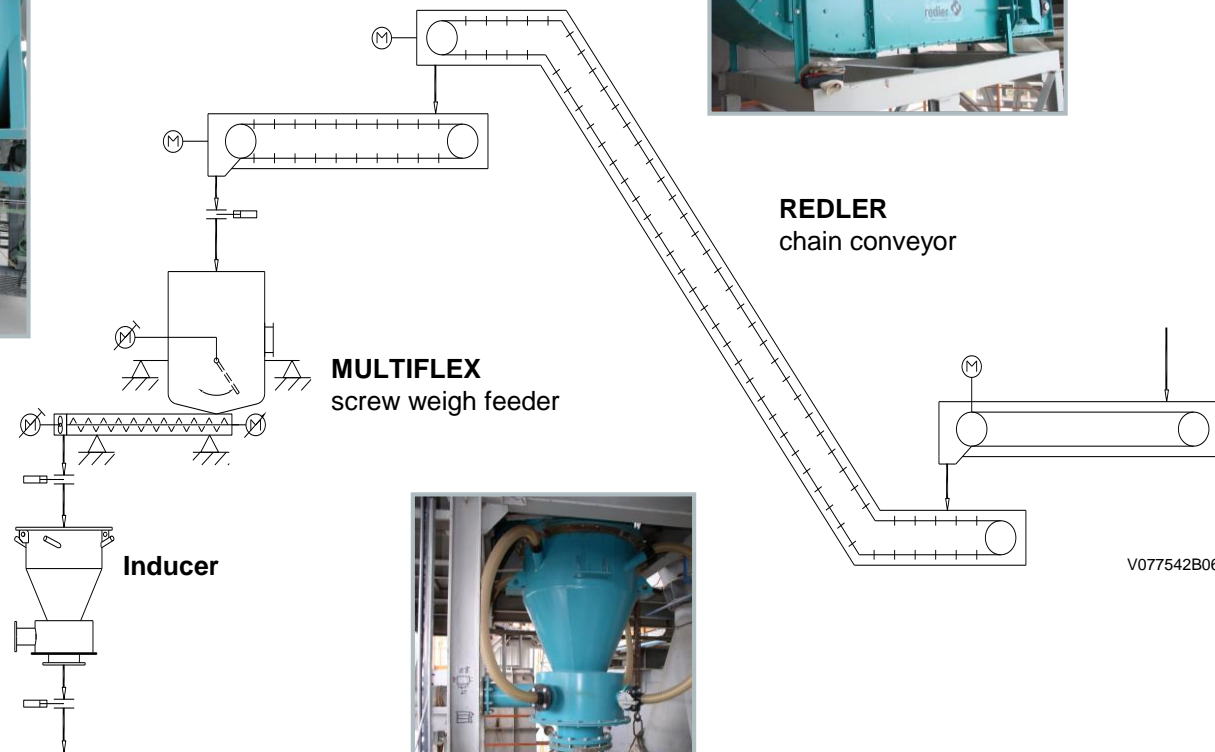
## Customer Example I

SSW storage, feeding and conveying to main burner



# Holcim Romania and Bulgaria

## Feeding AF to calciner



**REDLER**  
chain conveyor

**MULTIFLEX**  
screw weigh feeder

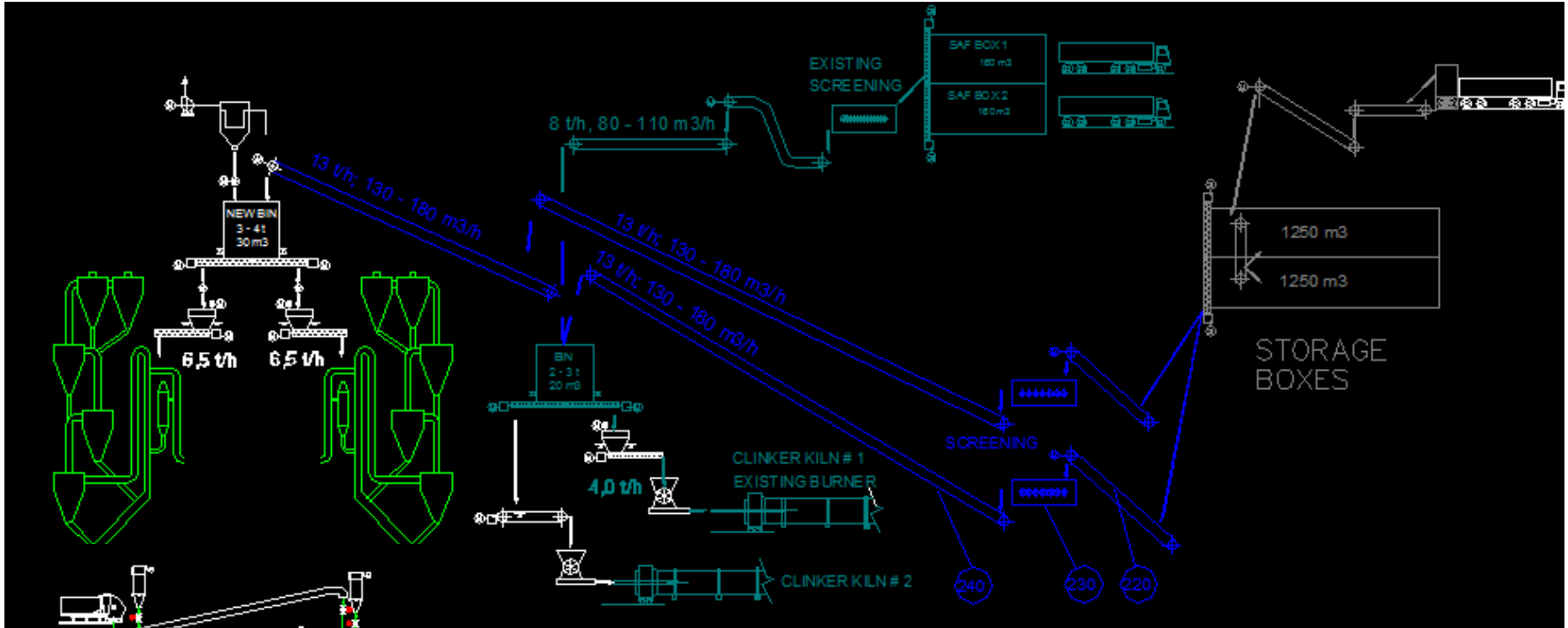
**Inducer**

to calciner or combustion chamber (inlet d=300mm)

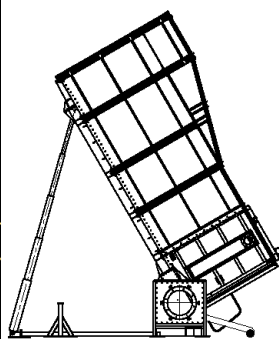
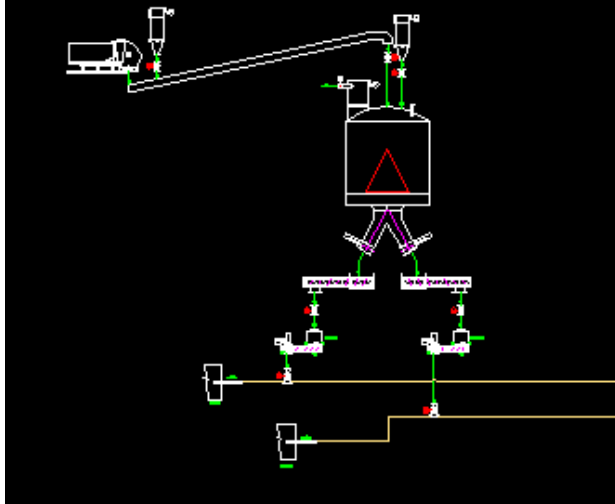
V077542B06

# Heidelberg Cement, Mokra plant

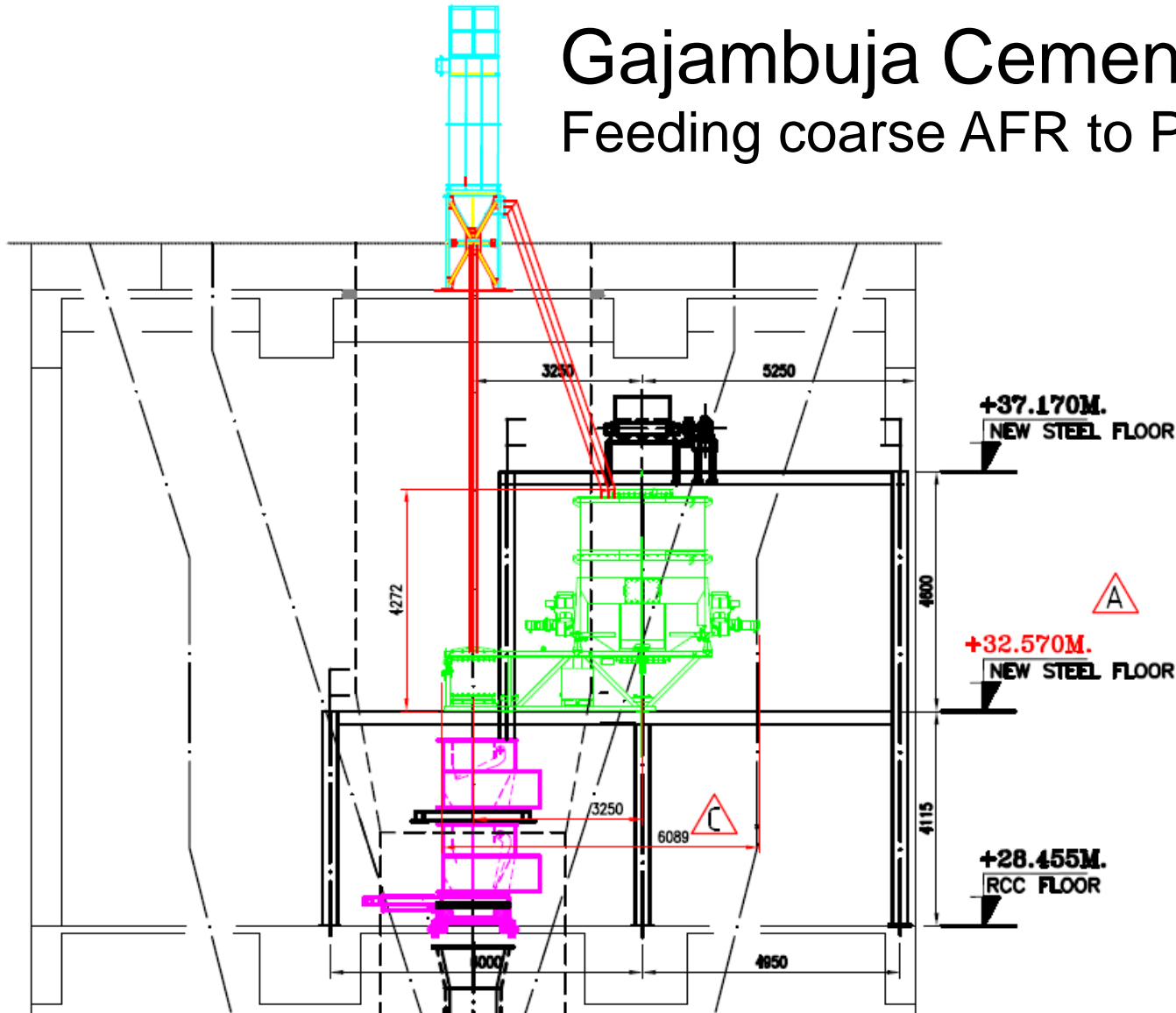
Feeding RDF to main burner and calciner (combustion chamber), 4 x 5 t/hr



## Feeding Sewage sludge to main burner 2 x 3 t/hr

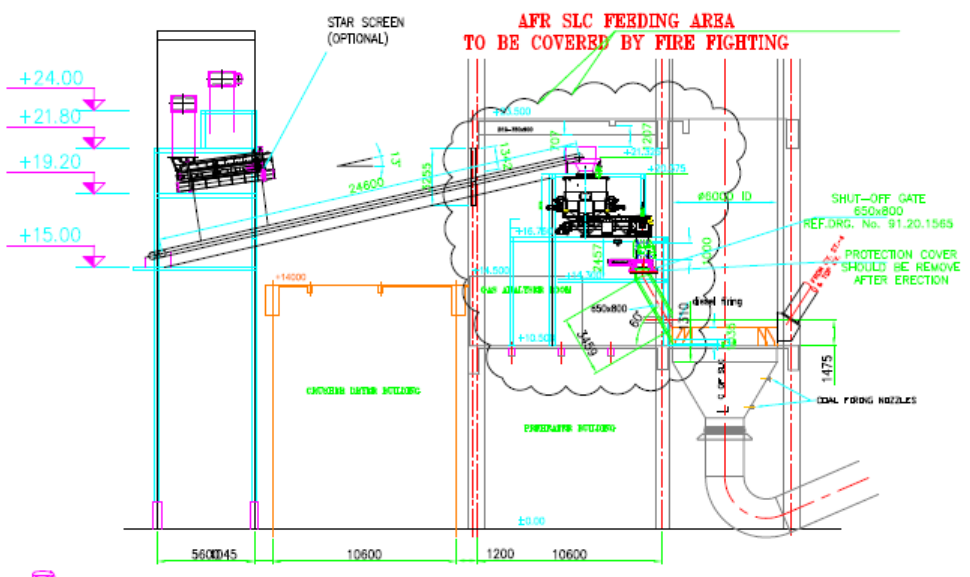
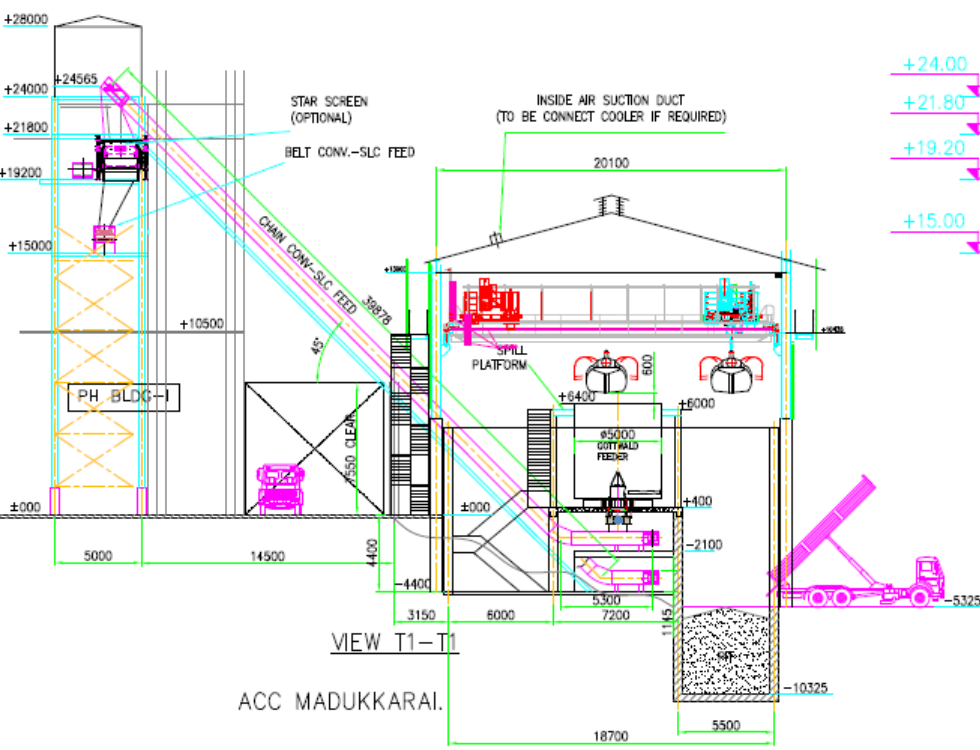


# Gajambuja Cement Feeding coarse AFR to Pre-calciner



# ACC Cement Madukkarai

## Feeding coarse AFR to Pre-calciner
















# Heidelberg Cement, Mokrá plant, Czech Republic

Feeding RDF to main burner and calciner (combustion chamber), 4 x 5 t/hr



# Schenck Process: Alternative Fuel Feeding Systems

## Schenck Process - Alternative Fuel Feeding Systems

Reception		Conveying	
	IntraBulk® Bulk Reception Unit		Pneumatic Conveying
	Dump & Docking Stations	Weighing & Feeding	
Storage			MULTIDOS® Weighfeeder (Apron & Belt)
			MULTIFLEX Weighfeeder (Screw)
			IDMS Blow Through Rotary Valve
	Storage Systems	Material Separation	
	Silo & Hopper Discharge		Screens & Separators
Conveying			
	MoveMaster® Chain Conveyors		
	TEDO® Tube & U-Conveyors		



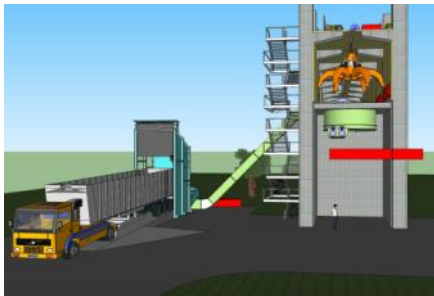
# Storing alternative fuels in hall Storage hall with the automatic crane



# Tasks of storage

## Storage concept

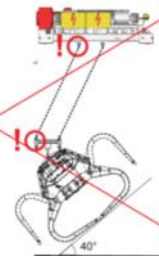
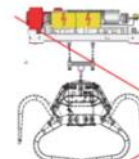
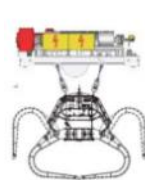
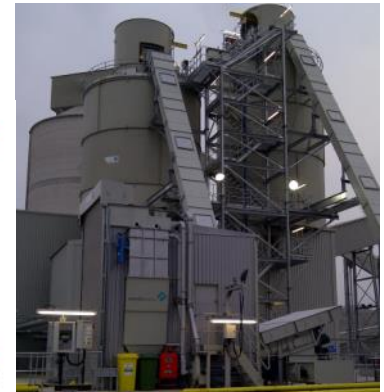
- ❖ **Type of the storage:** Reflecting the storage capacity and material to be stored we can provide you the best storage system.
- ❖ **Related technology:** Logistic, material reception – with or without underground civil works, material discharging, related conveying systems.
- ❖ **Specialty:** Grab inclination design.



We can supply grab that could be operated inclined



For major crane suppliers, grab inclination not possible !!!





# Schenck Process: Alternative Fuel Feeding Systems

## Reception



### IntraBulk® Bulk Reception Unit

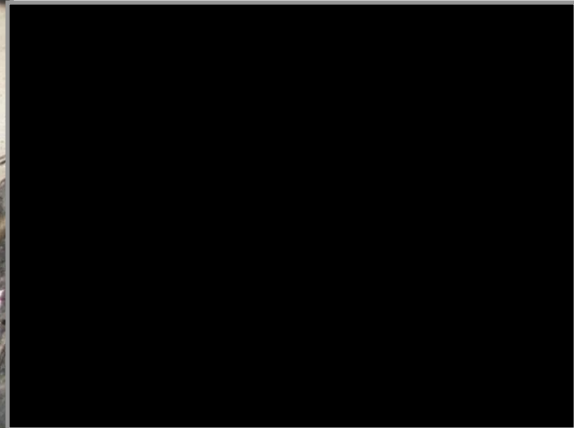
- No need for ground excavations and expensive civil engineering
- Fed from road vehicle or loader
- Fast vehicle turn around time
- Controlled discharge into process
- Quick installation and commissioning
- Depending on product characteristics discharge capacities can be in excess of 500 t/hr

# Knowing the material parameters is key to success



## Indonesia: Naragong

Feeding AF to Calciner, started-up in October 2012





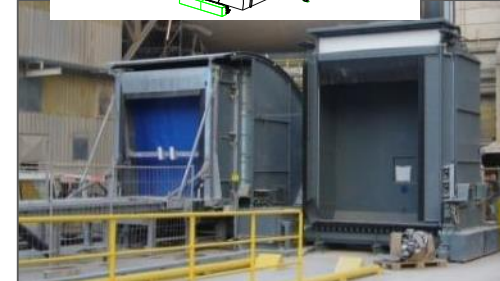
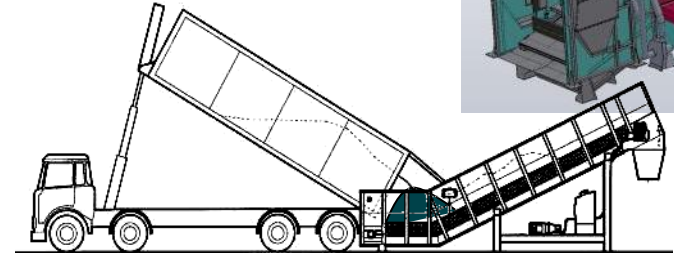
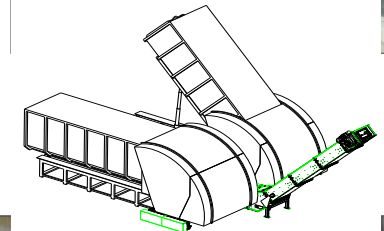
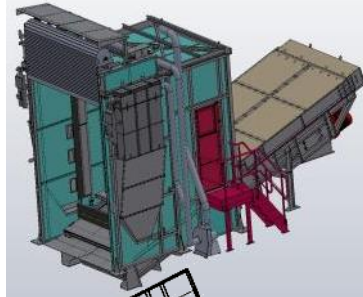
# Tasks of material reception Demands, Desire... ... and real solution by Schenck Process



**DT-Truck: MultiDock; BRU**

**WF-Truck: BRU; EcoDock; MultiDock;**

**Tipping containers:  
Tipping EcoDock**



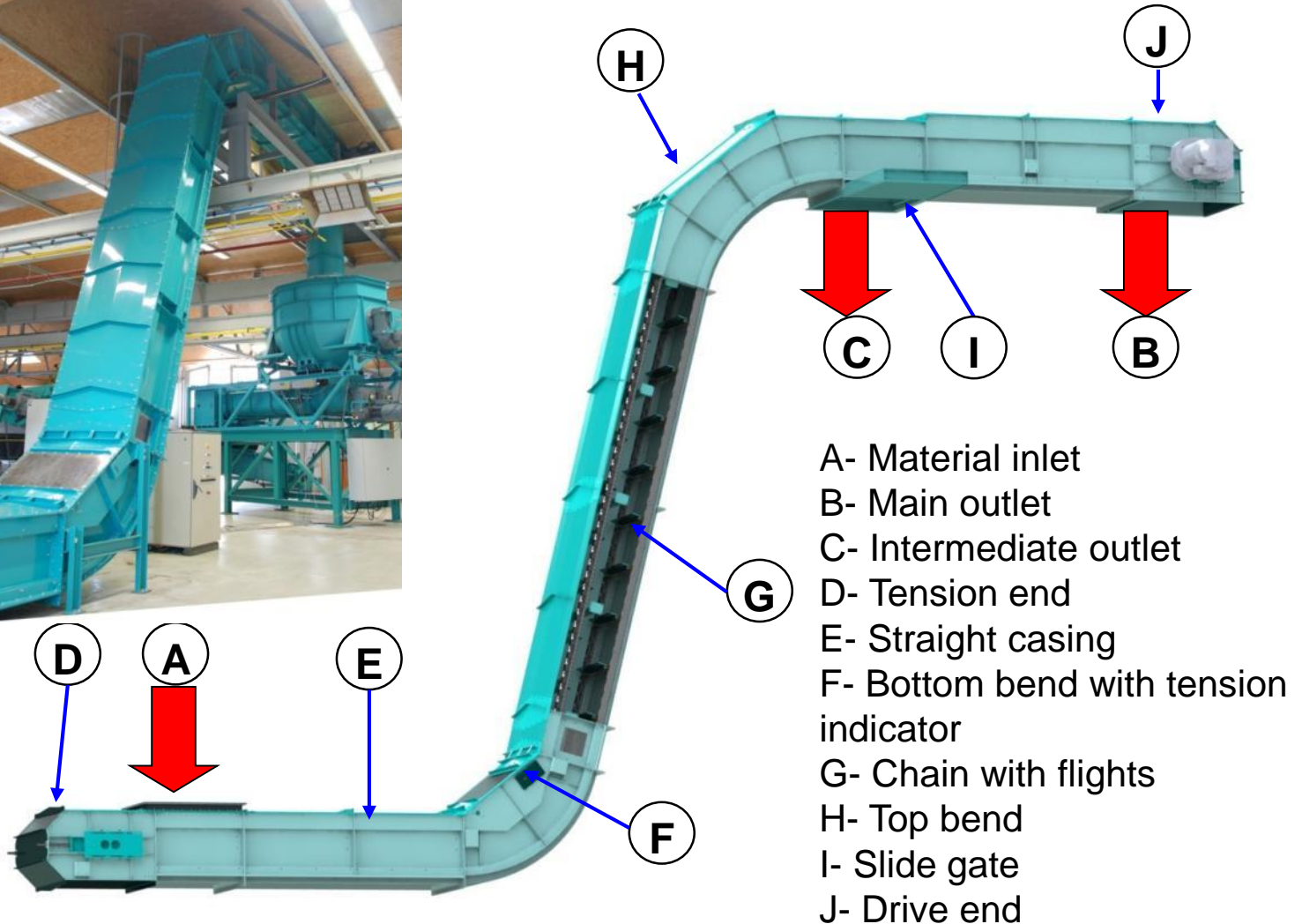
we make processes work

# 5 Conveying systems



# Chain conveyor update

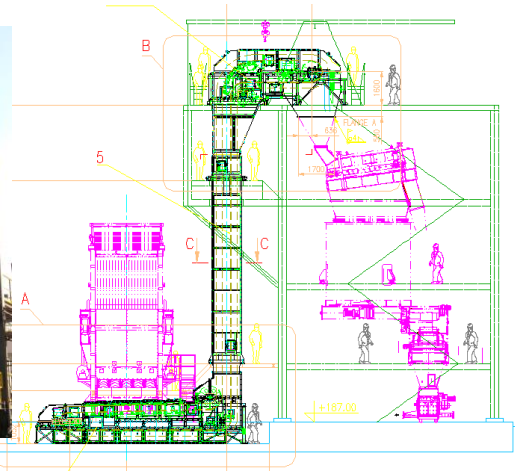
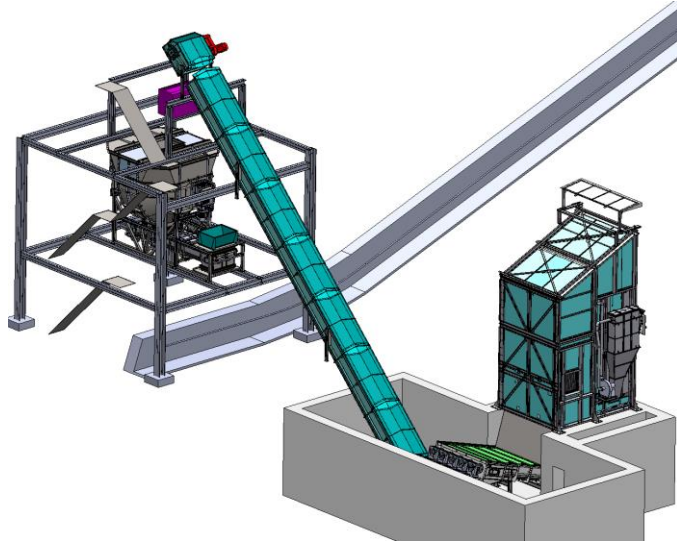
## New AF Movemaster chain conveyor





# Lafarge Cement plant Sokhna

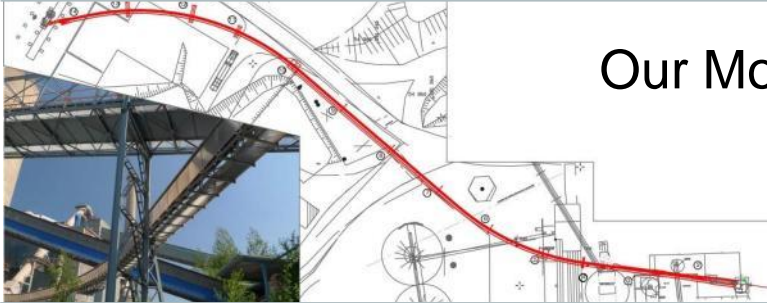
Installation of the three feeding lines RDF to calciner 15 (25) t/hr



we make processes work

# Tasks of Conveying Demands, Desire...

## ...and Real Installations



Our Motto:

„We will either find a way,  
or make one.“

Hannibal





# TEDO tube and U - conveyor

Reliable and spillage free conveying –  
Barriers in the conveying trajectory makes no problems for Schenck Process



TEDO tube conveyor

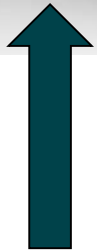
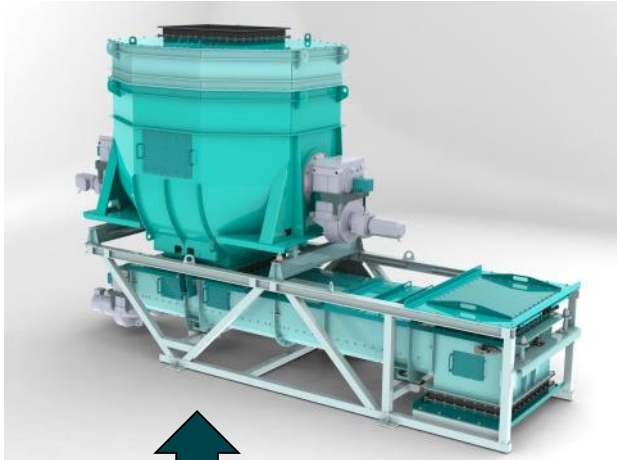


TEDO U - conveyor

- Able to handle long distances and problematic topographic areas
- Spillage free transportation of alternative fuels
- Inclination up to 30°
- Walk way integrated in support structure
- Long distance between support piles possible (>60m)



# Tasks of accurate dosing requirements and solution



## MultiFlex – compact closed unit

The most accurate weighfeeder for AF

## MultiDos – belt weigh feeder

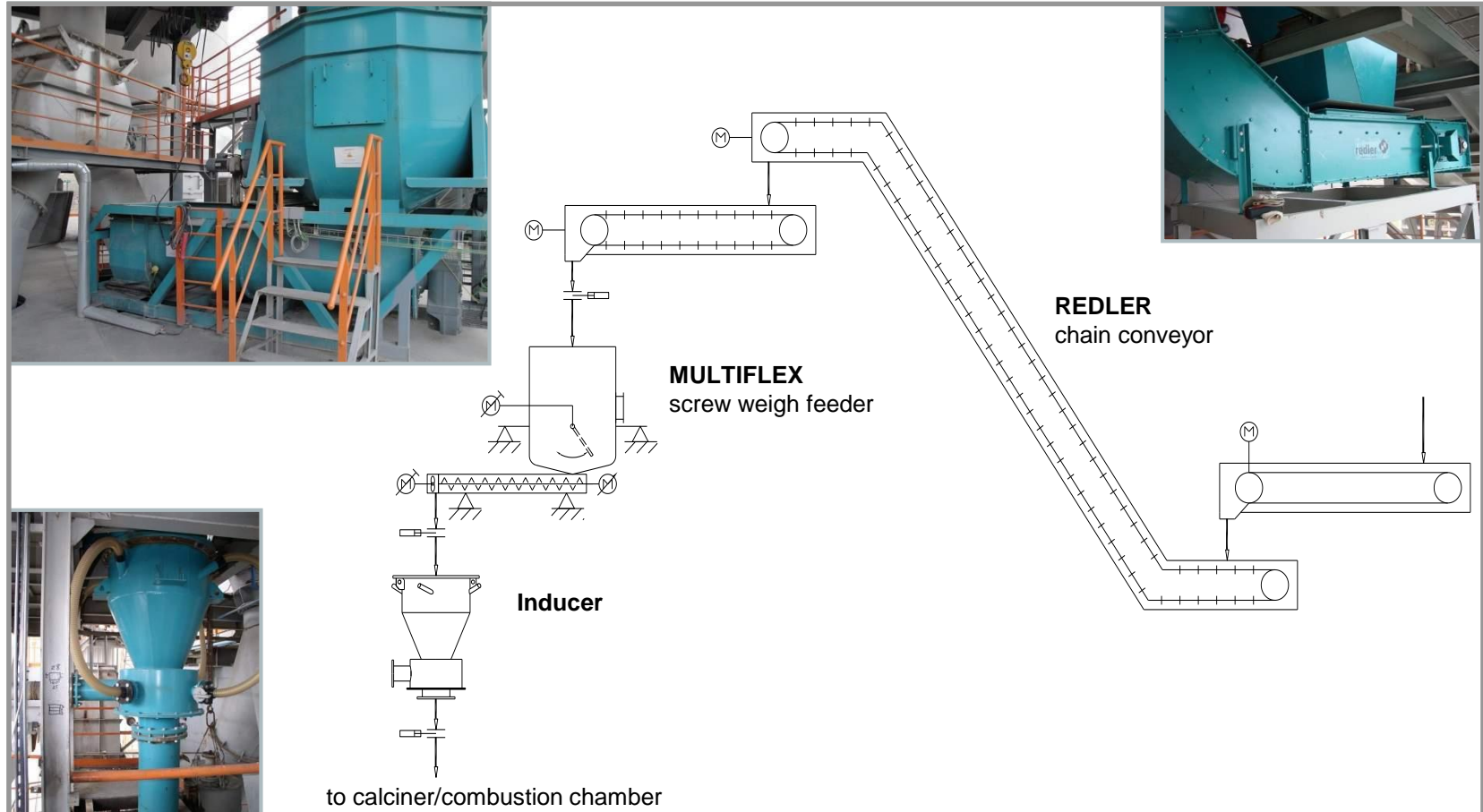


Pre-feeding system with adjustable feed rate



# Holcim Beli Izvor and Campulung

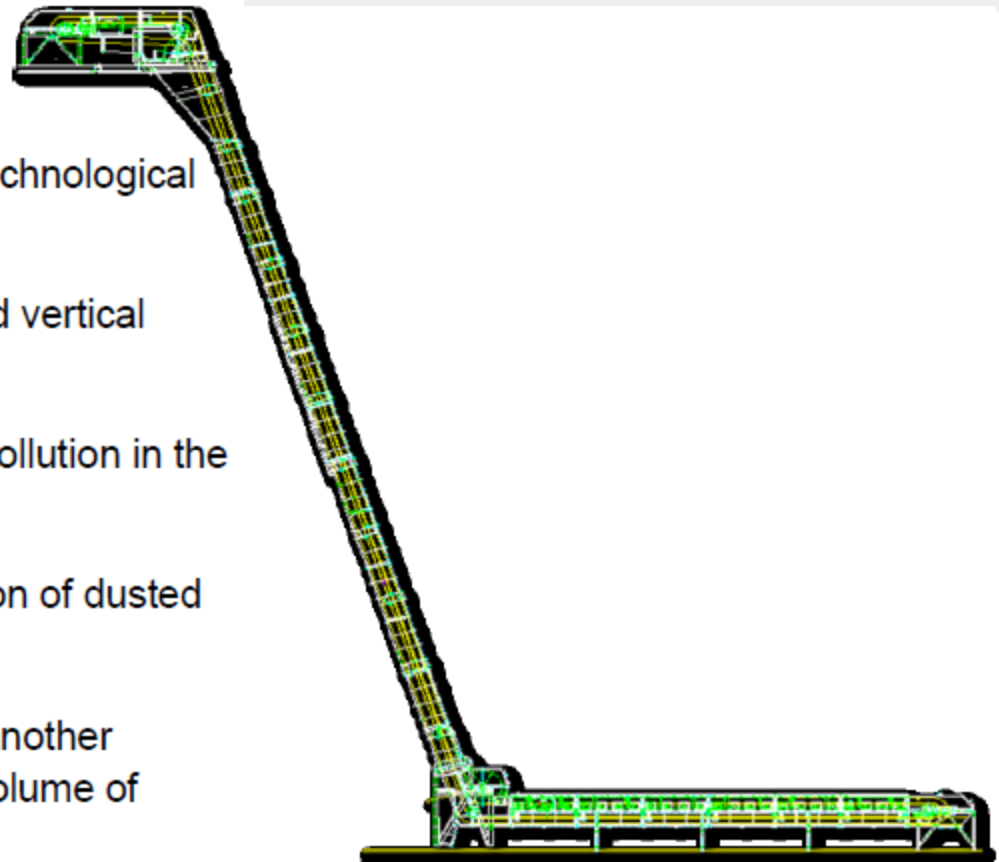
Example for Pre-Combustion Chamber Feeding



# Corrugated Conveyor

## Key Benefits

- ❖ Easy to integrate into the existing technological plants
- ❖ Capability to combine horizontal and vertical conveying within one equipment
- ❖ Closed system, no or just minimal pollution in the conveyor surroundings
- ❖ Self-cleaning capability and collection of dusted material inside the conveyor body
- ❖ Conveyed capacity comparable to another technological conveying up to the volume of  $1,500 \text{ m}^3/\text{h}$



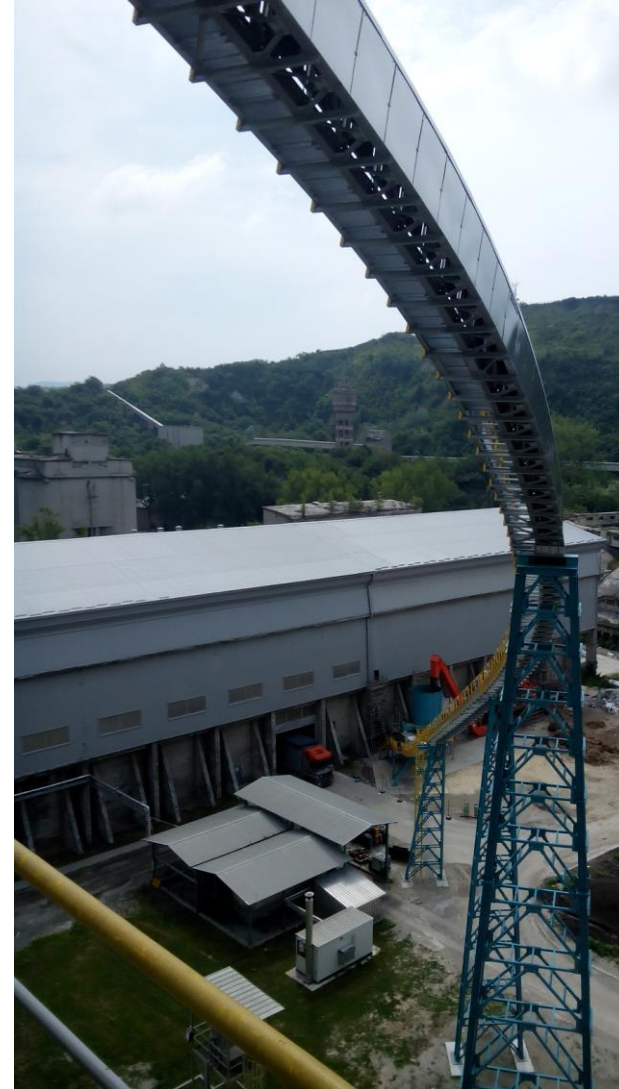




we make processes work

# Lafarge Cement plant Beocim

Feeding RDF to calcinatory 15 t/hr



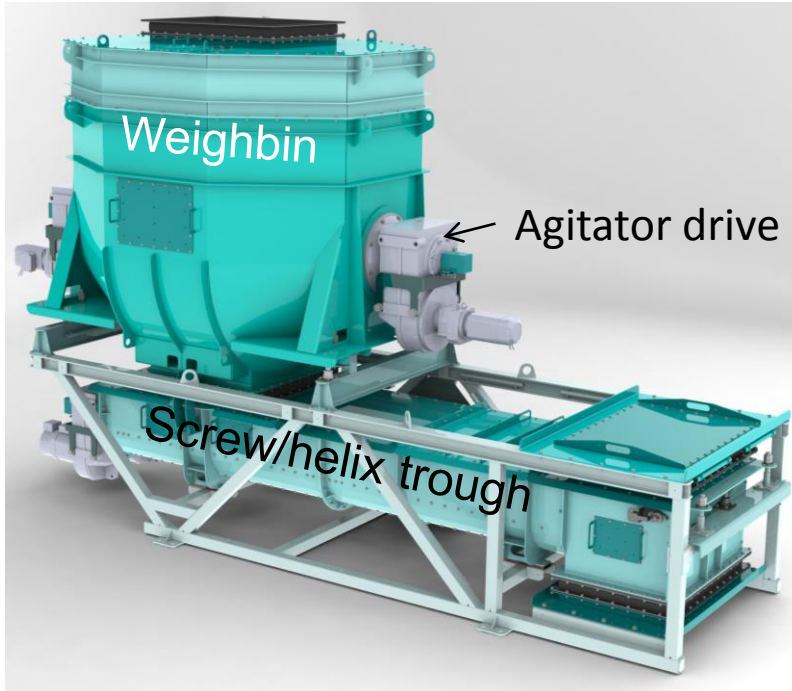
we make processes work

6

## Weighing & Feeding near to Kiln burner & Pre-calciner



## MultiFlex Screw Weighfeeder

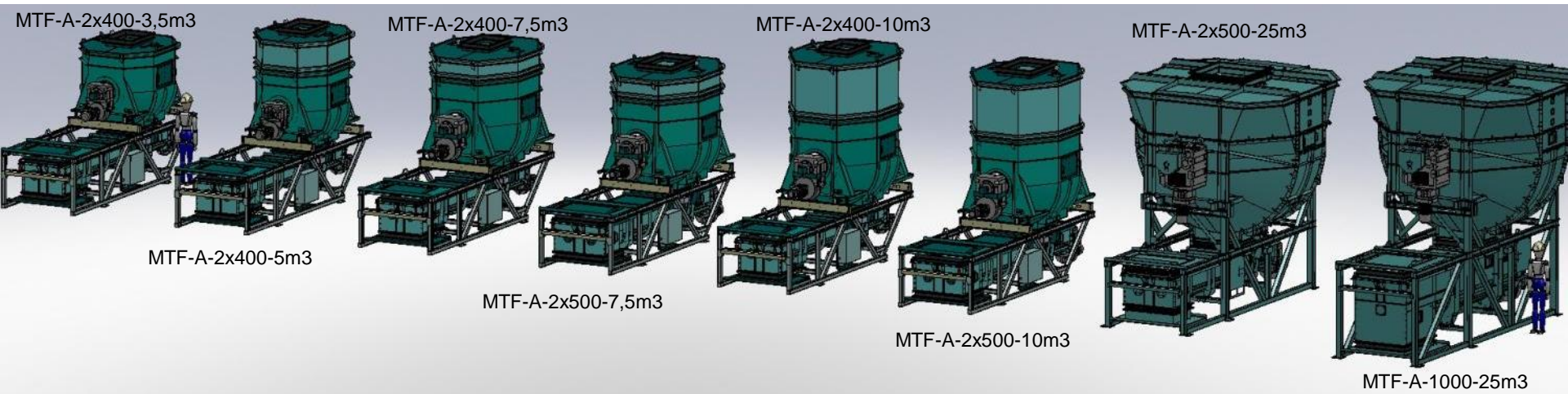


- Flexible screw weighfeeder in dust-tight, enclosed design
- Suitable for all kinds of alternative fuels (explosive and non-explosive)
- Designed for materials with bulk density between 0.05 - 0.7 t/m<sup>3</sup> and particle size up to 100mm
- Designed for hoppers of up to 25m<sup>3</sup>
- Feed rate of 6 to 200 m<sup>3</sup>/hr (up to 400m<sup>3</sup>/hr)
- High feed constancy, reliability & flexibility
- Easy maintenance



# Screw weigh feeder Multiflex

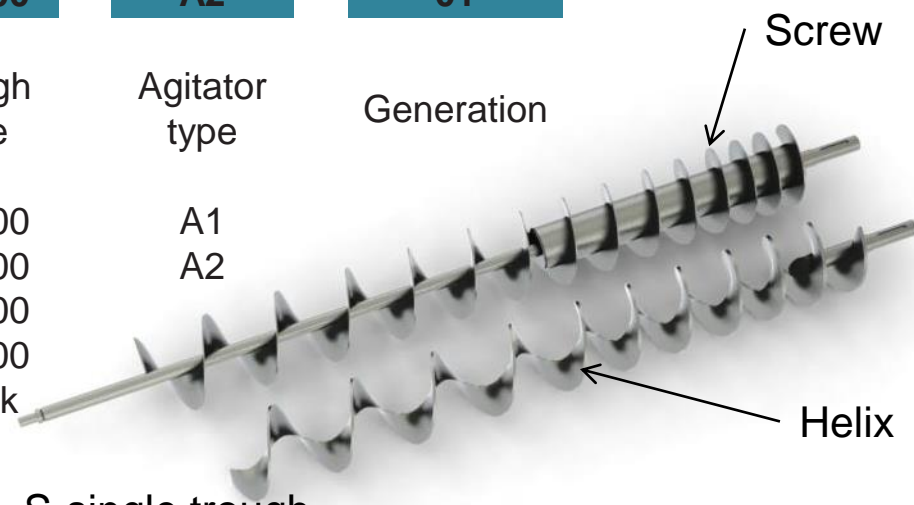
## Standard family



**MTF** - **H7,5** - **FA** - **HE500** - **A2** - **01**

MultiFlex weightfeeder	Hopper size	Frame type	Trough type	Agitator type	Generation
	H3,5	FA	SC400	A1	
	H5	FXLA	HE400	A2	
	H7,5	FXLS	SC500		
	H10		HE500		
	H25		HE1k		

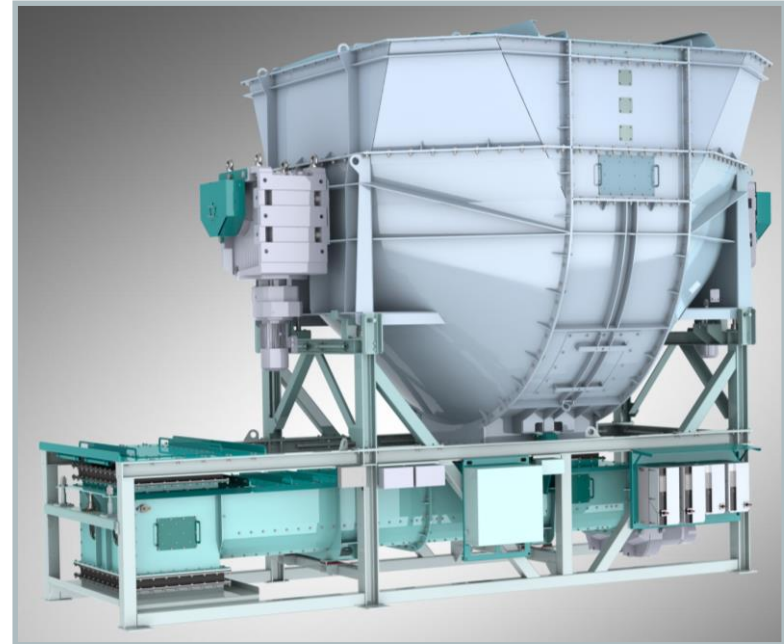
Hxx- xx- volume[m3]  
 Fx- XL-for H25; A-double trough, S-single trough,  
 HE/SCxxx- HE-helix; SC-screw, xxx- diameter of HE/SC [mm]  
 Ax- 1- single agitator; 2- double agitator





# Screw weigh feeder Multiflex Other examples

Bolu Cimento, OYAK Group, Turkey



**Movie:** RDF reception and feeding to calciner,

# Screw weigh feeder Multiflex Pressure proof units

Akcansa Cimento, Büyükcekmece plant, Turkey  
Reception, storage and feeding sewage sludge to three main burner



## **MULTIFLEX Screw Weighfeeder, 10 bar shock pressure proof**

- Flexible screw weigh feeder in dust-tight, enclosed design
- Suitable for explosive alternative fuel (e.g. sewage sludge)
- Designed for materials with bulk density between 0.05 - 0.7 t/m<sup>3</sup>
- Designed for hoppers of up to 10m<sup>3</sup>
- Feed rate of 6 to 100 m<sup>3</sup>/hr
- High feed constancy, reliability & flexibility
- Easy maintenance

# Reliable feeding of alternative fuels

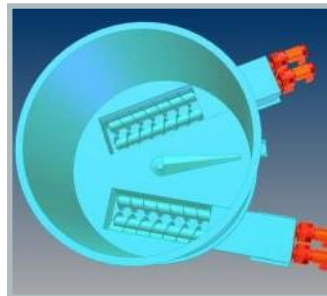


## Intermediate and distribution hopper

- Various diameter of double extraction screws, shaftless screws available as option to avoid any wind ups
- Inlet area ensures continuous filling of feeding screw
- More than 50 installations around the world
- Variable speed drive for extraction screws and agitator, controlled by downstream weigh belt feeder MULTIDOS®
- Capacity up to 50 m<sup>3</sup> available
- Dust tight

## MULTIDOS® Belt Weighfeeder

- Continuous gravimetric feeding of bulk solids
- Accuracy (related to actual value):  $\pm 1\%$
- Rugged design suitable for the harshest demands
- MechaTronic design with integrated electronics
- Safe belt run monitoring and tracking
- Easy belt change without auxiliaries
- Throughput rate: up to 200 m<sup>3</sup>/hr
- Conveying speed: max. 0.5 m/s





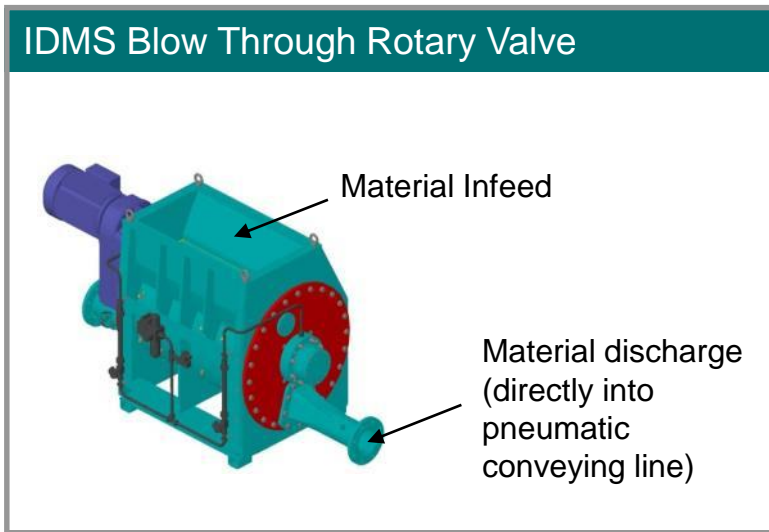
## IDMS Blow Through Rotary Valve



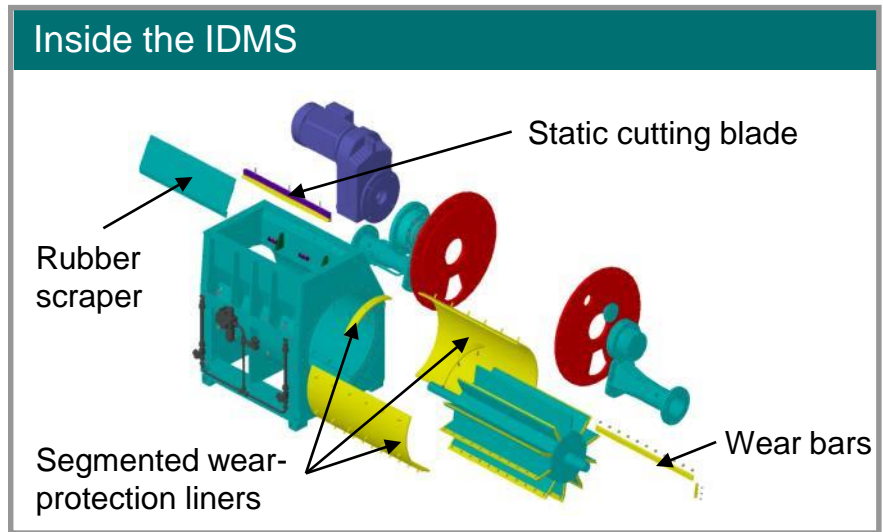
- Feed rate up to 20 t/hr
- High degree of filling through large inlet section
- Robust cutting blade for reliable handling of oversize material
- Blow through design for feeding cohesive fuels



# IDMS Blow Through Rotary Valve



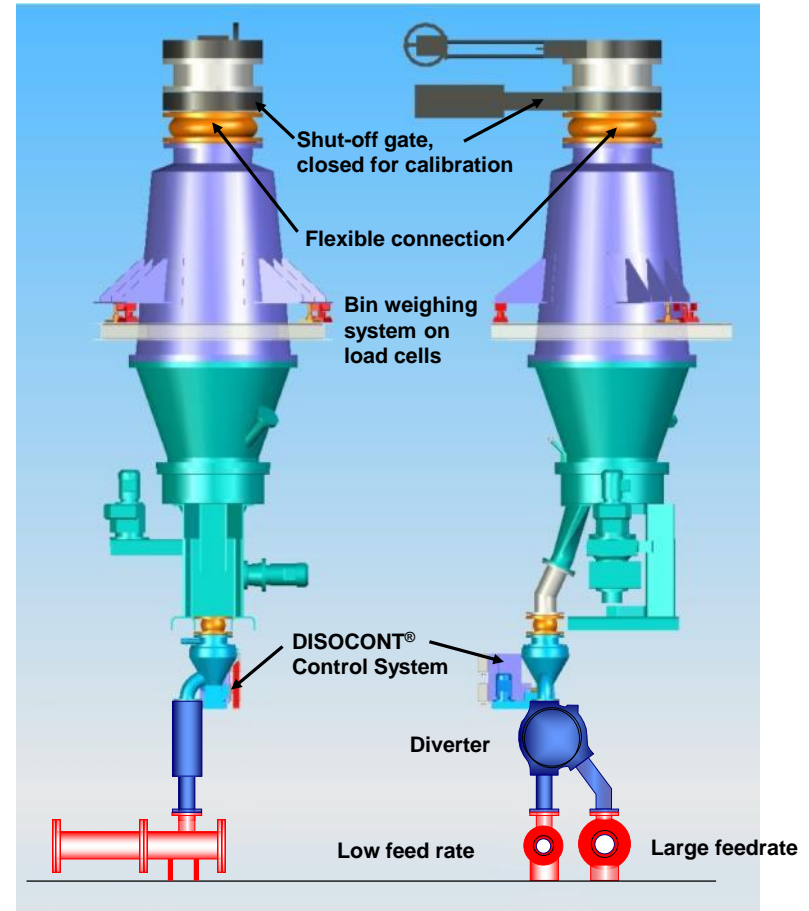
In-line feeding to pressurised pneumatic conveying systems



All wear parts exchangeable from the plant site

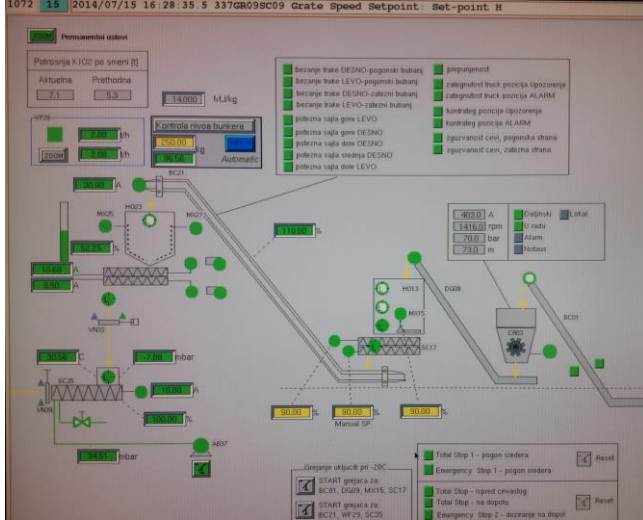
# Demands on carbon black feeding/blending systems as secondary fuel

- Wide feed rate ranges: 1:50 – 1:100
- Design of feeding equipment for low feed rates suitable
- Possibility to use two conveying lines (only for calciner)
- Possibility of on stream calibration (mainly at low feed rates)



# Lafarge Cement plant Beocim

## Feeding RDF to calcinatory 15 t/hr



**LET US JOIN HAND & MAKE A CLEAN INDIA**

Thank you very much  
one company  
one vision

For any question ??

Contact:

Prasenjit Sarkar

Cell # +91 9955998499

mail ID: [prasenjit.sarkar@schenckprocess.in](mailto:prasenjit.sarkar@schenckprocess.in)