raízen

Development of Dry Cleaning and Trash Preparation for Combustion in Brazil

ISSCT Factory Workshop – Australia
8 – 12 May 2011

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Historic of Dry Cleaning in Brazil

Original Reasons for the Development

- Plan to stop cane burning prior to harvesting.
- Increasing mechanical harvesting of cane.
- Avoid or reduce use of water to clean the cane.
- Reduce sugar losses due to cleaning
- Preserve the milling capacity of the Factories
- Reduce wear of milling

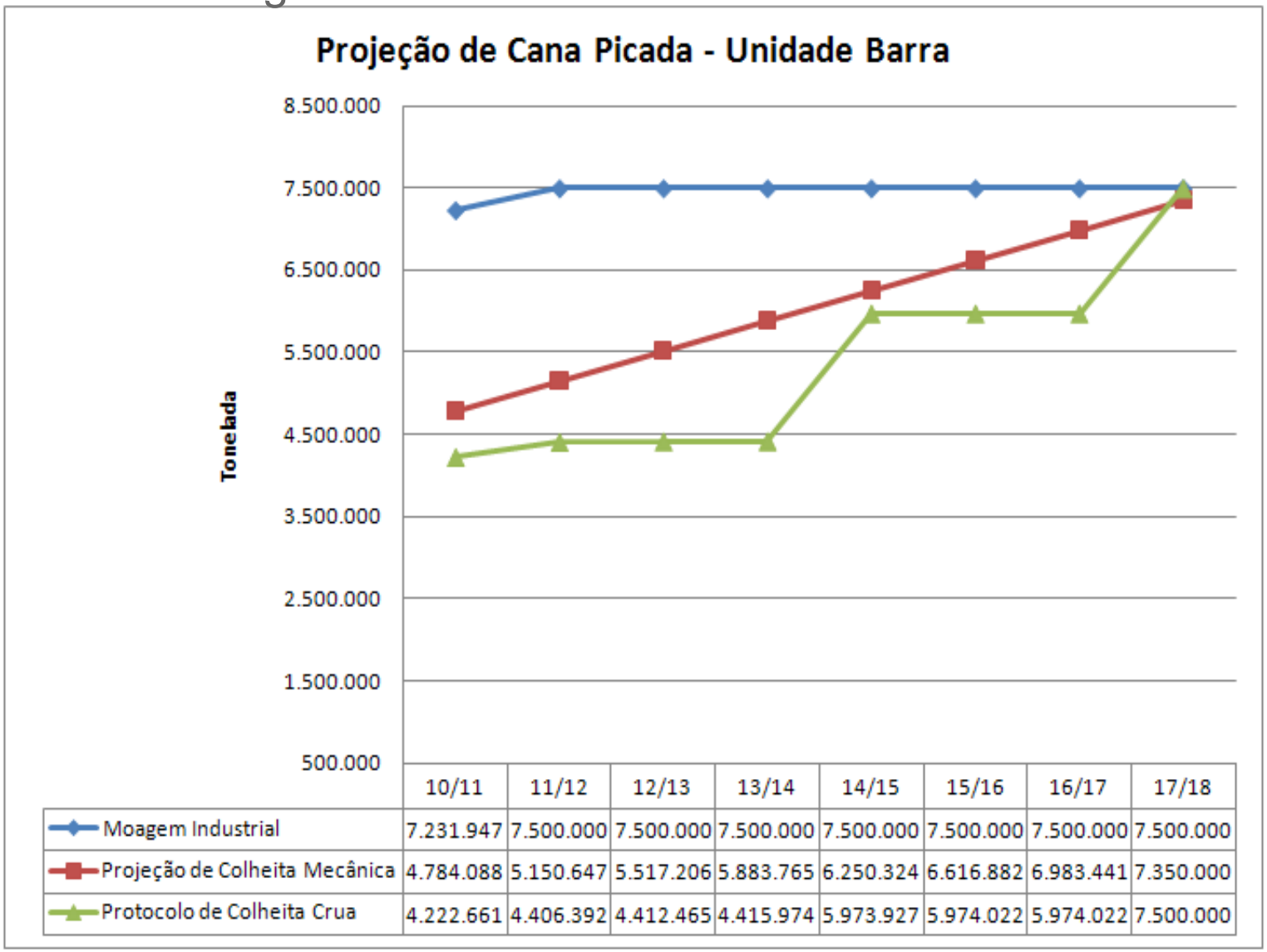
Historic of Dry Cleaning in Brazil

Present Reasons For the Development

- Plan to stop cane burning prior to harvesting.
- Increasing mechanical harvesting of cane.
- Avoid or reduce use of water to clean the cane.
- Reduce sugar losses due to cleaning
- Preserve the milling capacity of the Factories
- Reduce wear of milling, process and vapor generation equipment
- Use of biomass for energy production
- Future usage of biomass (alcohol production)

Historic of Dry Cleaning in Brazil

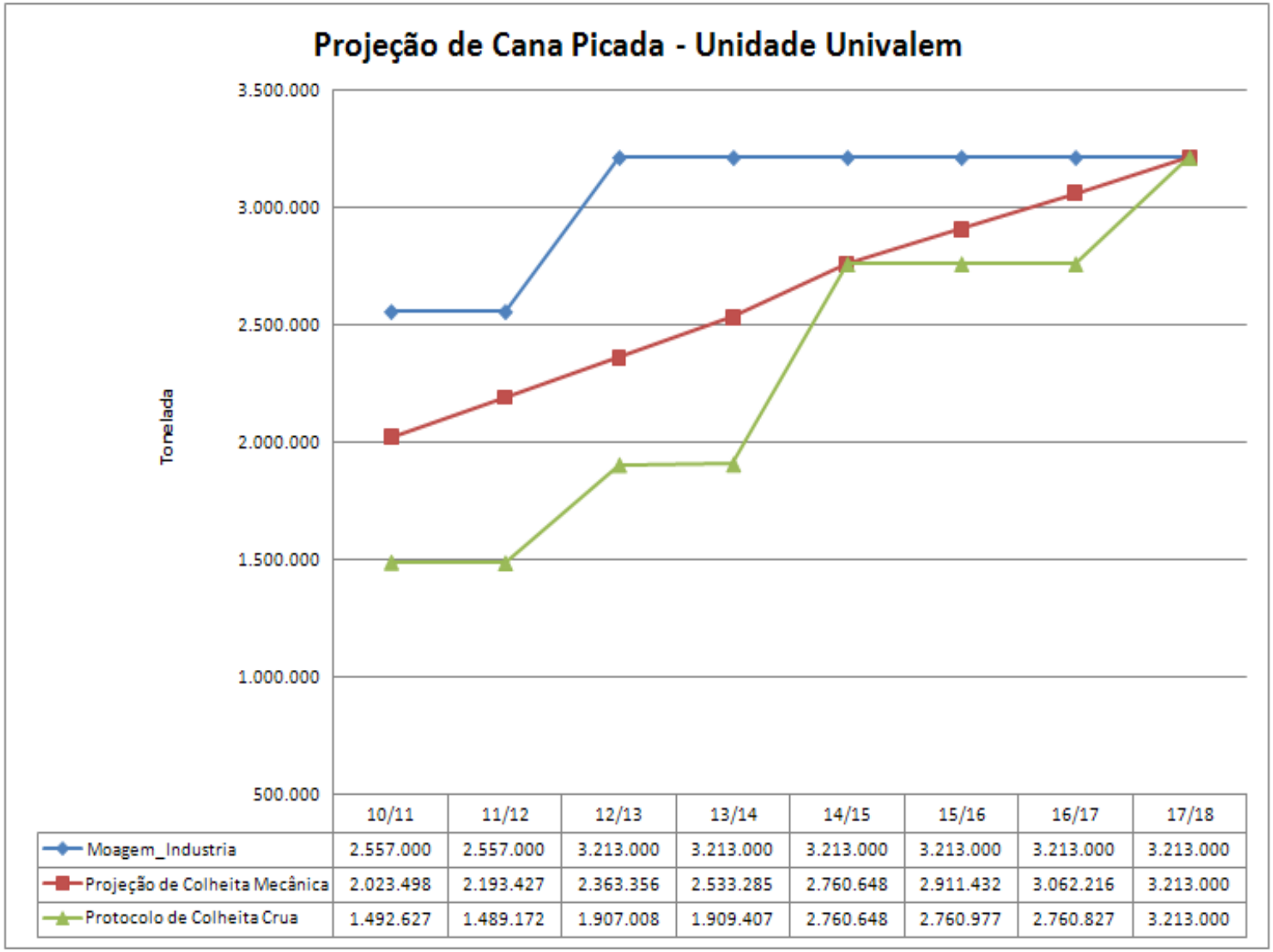
Season Crushing – Mechanical Harvested Cane – Green Cane



	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18
Moagem Industrial	7.231.947	7.500.000	7.500.000	7.500.000	7.500.000	7.500.000	7.500.000	7.500.000
Projeção de Colheita Mecânica	4.784.088	5.150.647	5.517.206	5.883.765	6.250.324	6.616.882	6.983.441	7.350.000
Protocolo de Colheita Crua	4.222.661	4.406.392	4.412.465	4.415.974	5.973.927	5.974.022	5.974.022	7.500.000

Historic of Dry Cleaning in Brazil

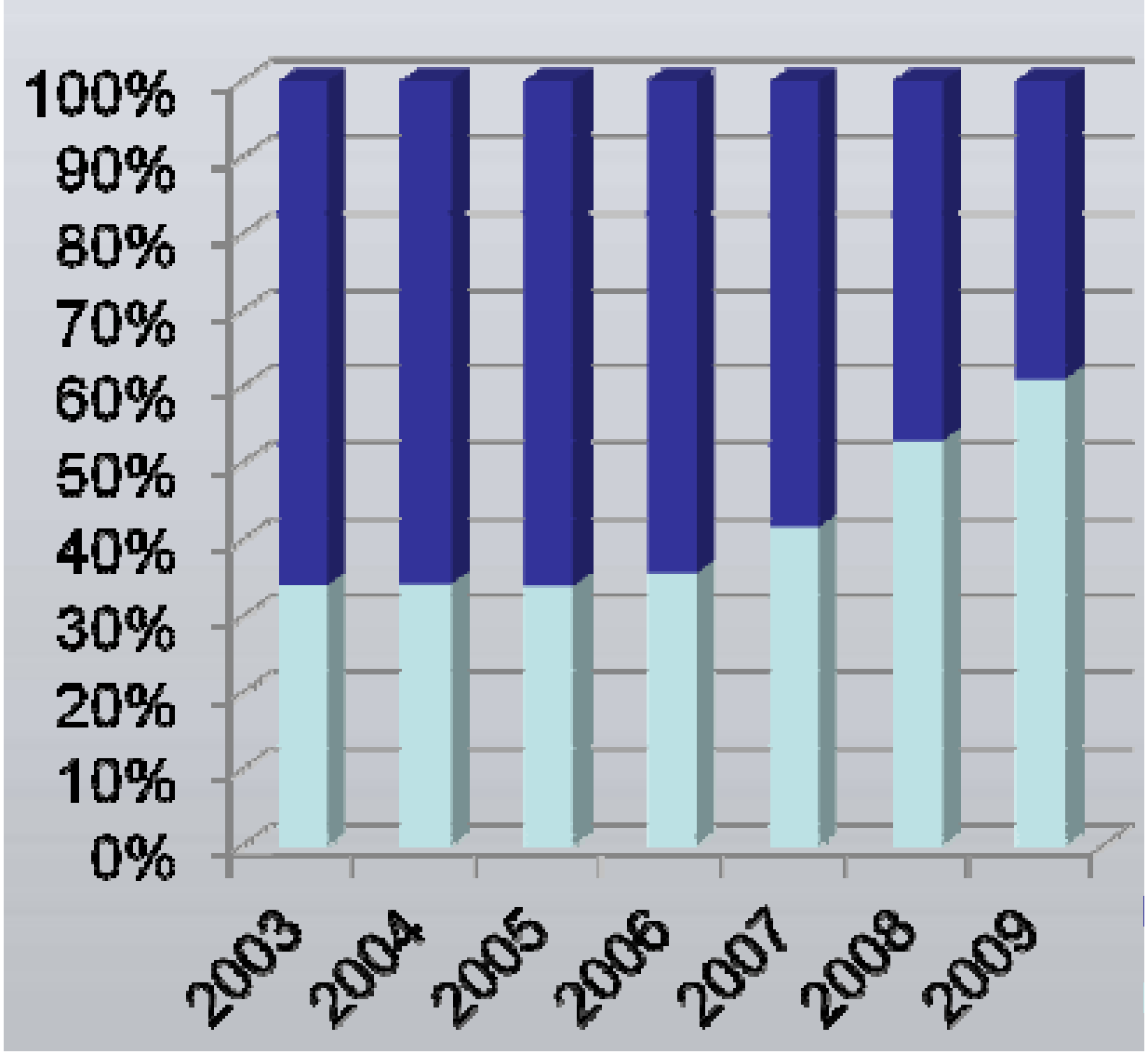
Season Crushing – Mechanical Harvested Cane – Green Cane



	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18
Moagem_Industria	2.557.000	2.557.000	3.213.000	3.213.000	3.213.000	3.213.000	3.213.000	3.213.000
Projeção de Colheita Mecânica	2.023.498	2.193.427	2.363.356	2.533.285	2.760.648	2.911.432	3.062.216	3.213.000
Protocolo de Colheita Crua	1.492.627	1.489.172	1.907.008	1.909.407	2.760.648	2.760.977	2.760.827	3.213.000

Historic of Dry Cleaning in Brazil

Mechanical Harvested Cane in Brazil



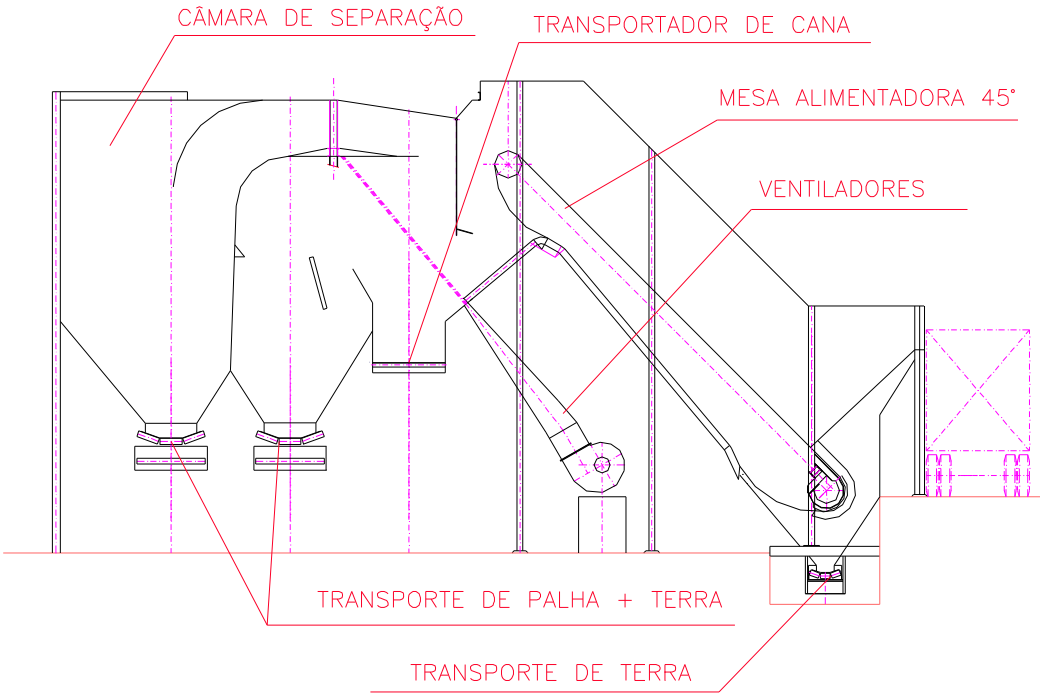
Historic of Dry Cleaning in Brazil

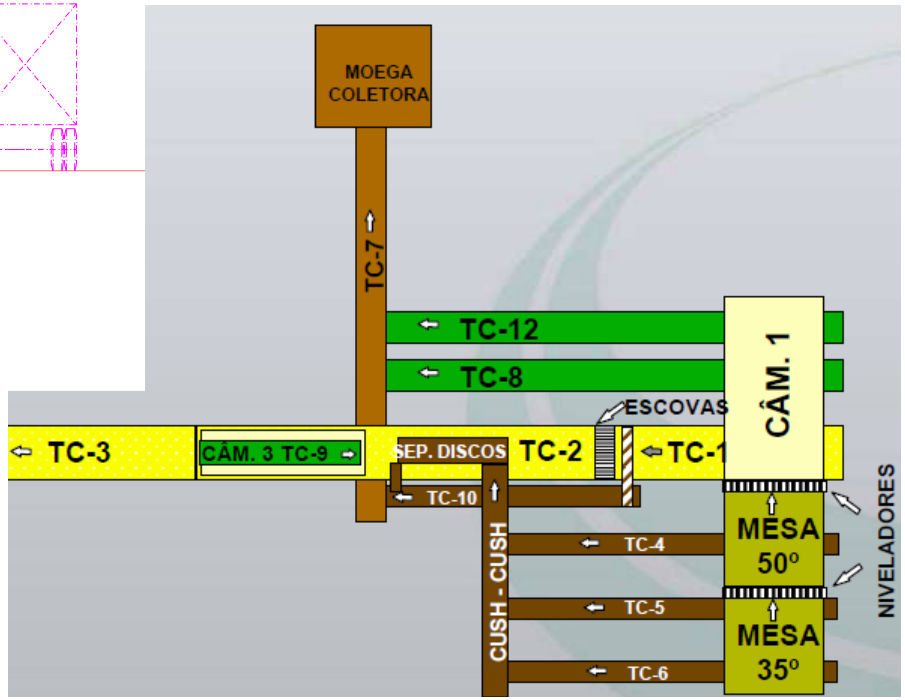
Use of Water and Sugar Losses



Historic of Dry Cleaning in Brazil

First Commercial Installation – Quatá Factory - 1993





Historic of Dry Cleaning in Brazil

First Commercial Installation – Quatá Factory – 1993



EFFICIENCIES

Mineral: 45 – 72 %
Vegetal: 55 – 60 %
Overall: 46 – 60 %



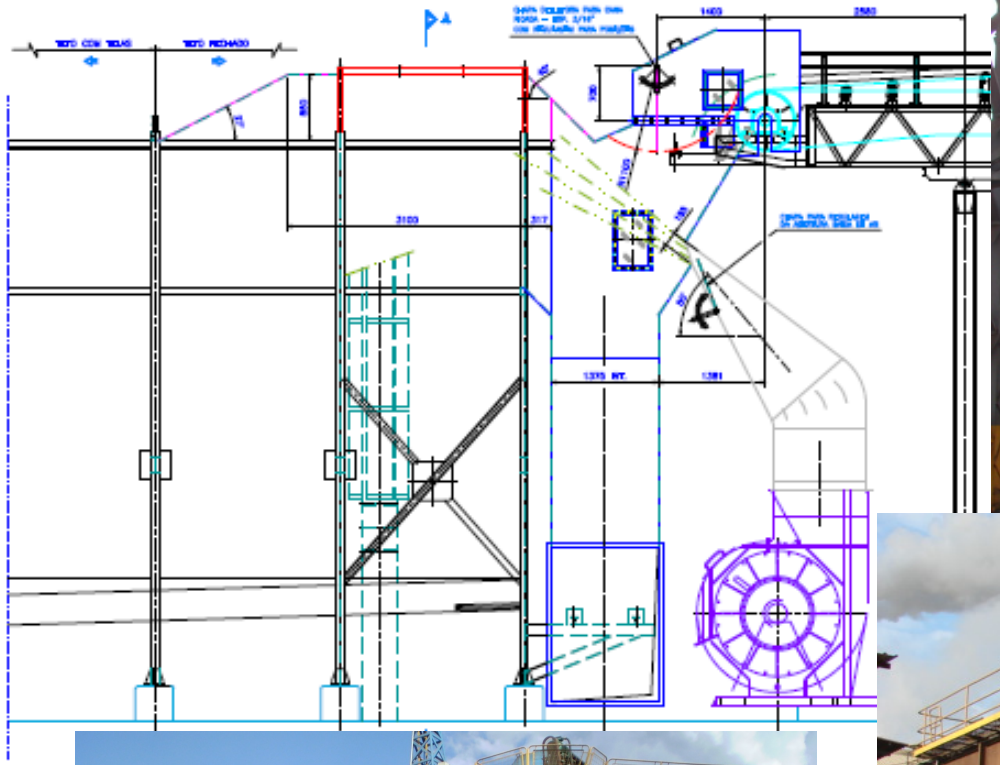
Evolution of Separation Efficiency

Equipment, Configuration, Design and Air Flow Conditions

- Equipment: 45º Feeding Table / Metallic Conveyor / Belt Conveyor.
- Air blowing position and direction.
- Air flow rate X air velocity.
- Separation chambers configuration.
- Collection chambers design.
- Cane speed through the air jet X Cane layer thickness

Evolution of Separation Efficiency

Up Blowing at the Belt Conveyor Discharge









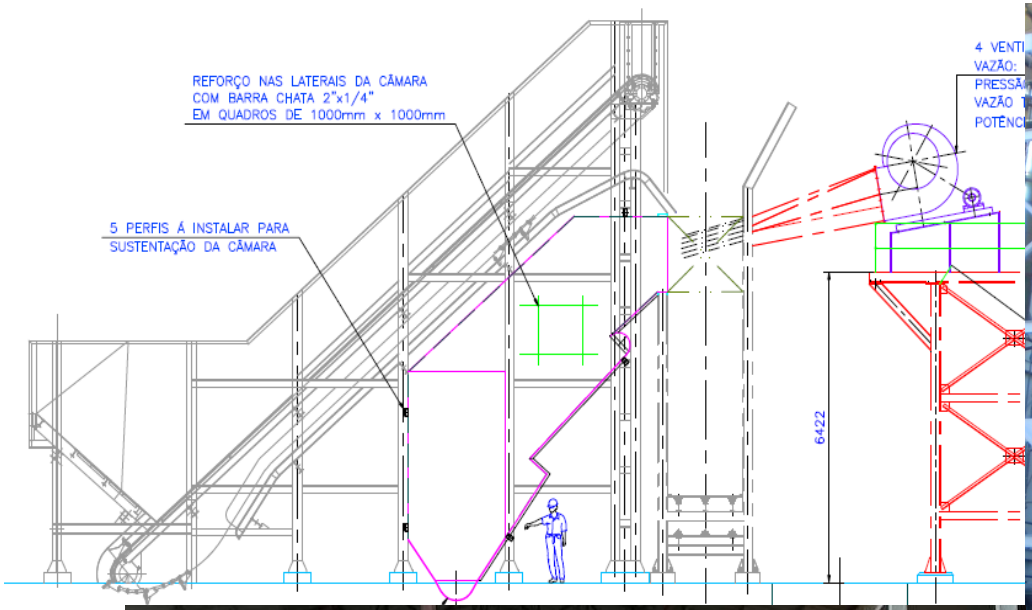
Evolution of Separation Efficiency

Up-Down Blowing Between Belt Conveyors



Evolution of Separation Efficiency

Up-Down Blowing in 45º Feeding Tables

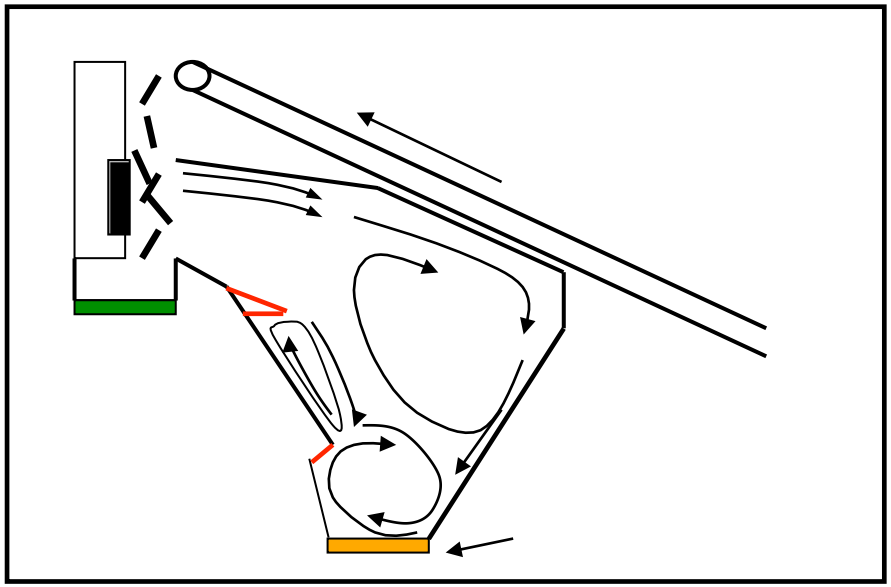




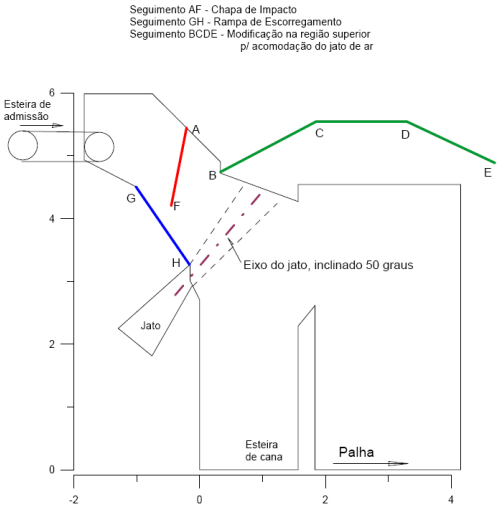


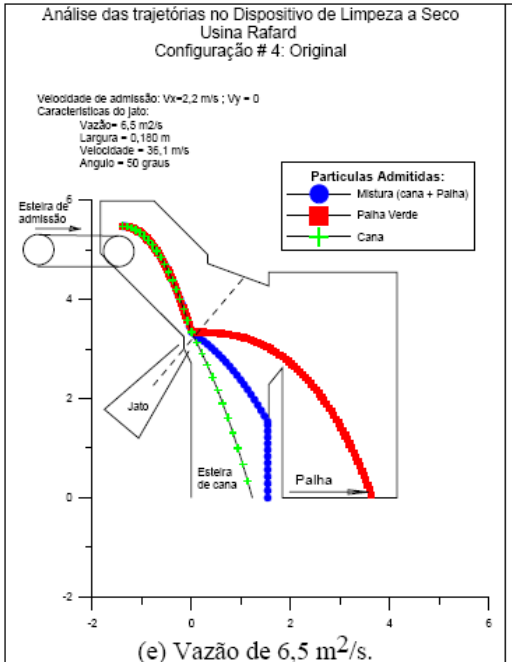
Evolution of Separation Efficiency

Separation and Collection Chambers Configuration

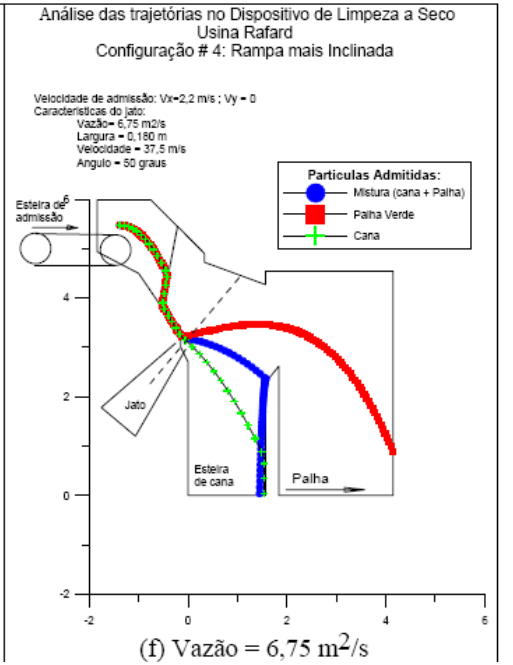


Modificações p/ o Dispositivo de Limpeza a Seco
Usina Rafard
Configuração # 4: Rampa mais Inclinada





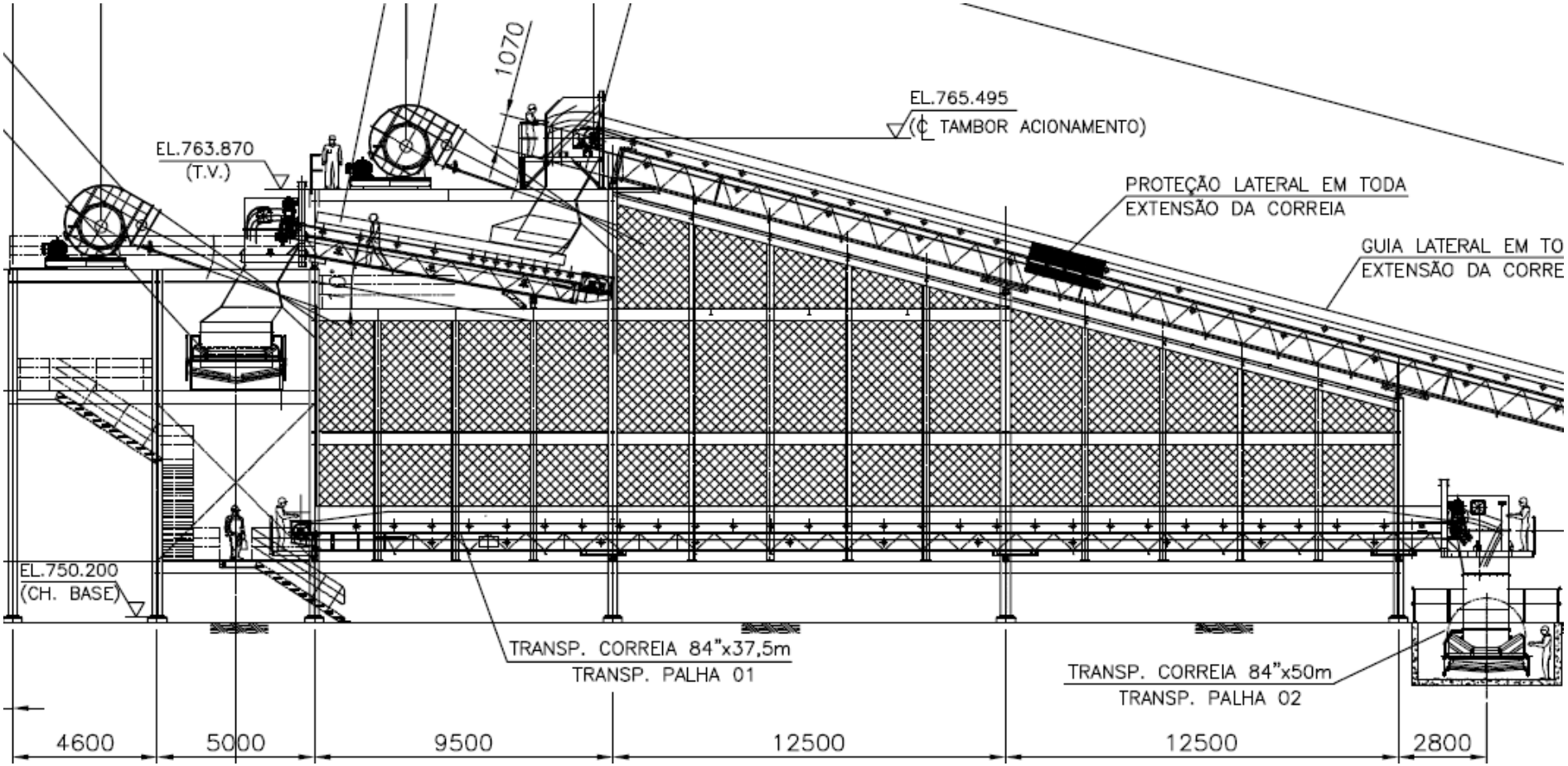
(e) Vazão de 6,5 m^2/s.



(f) Vazão = 6,75 m^2/s

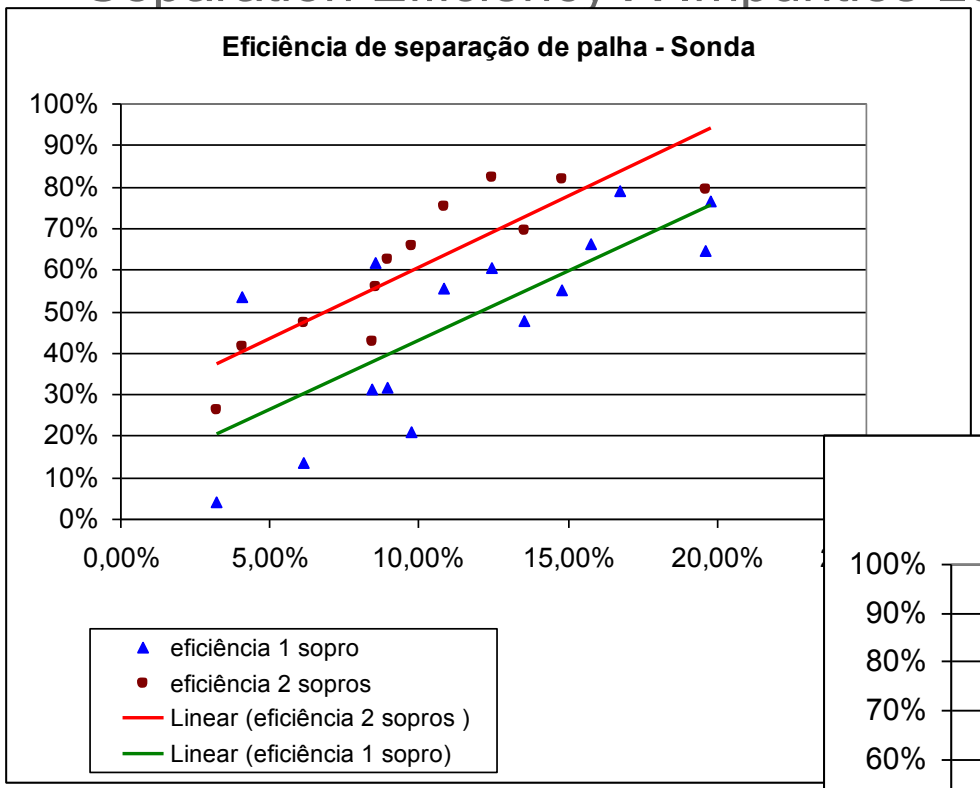
Evolution of Separation Efficiency

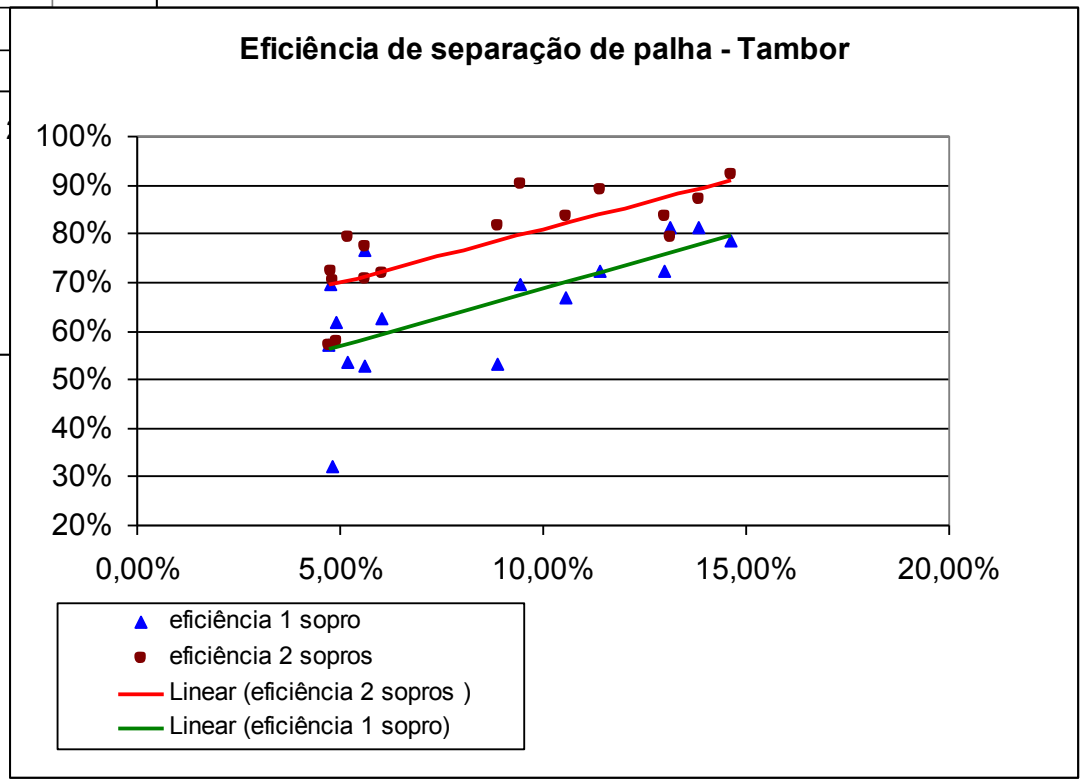
Separation and Collection Chambers Configuration



Evolution of Separation Efficiency

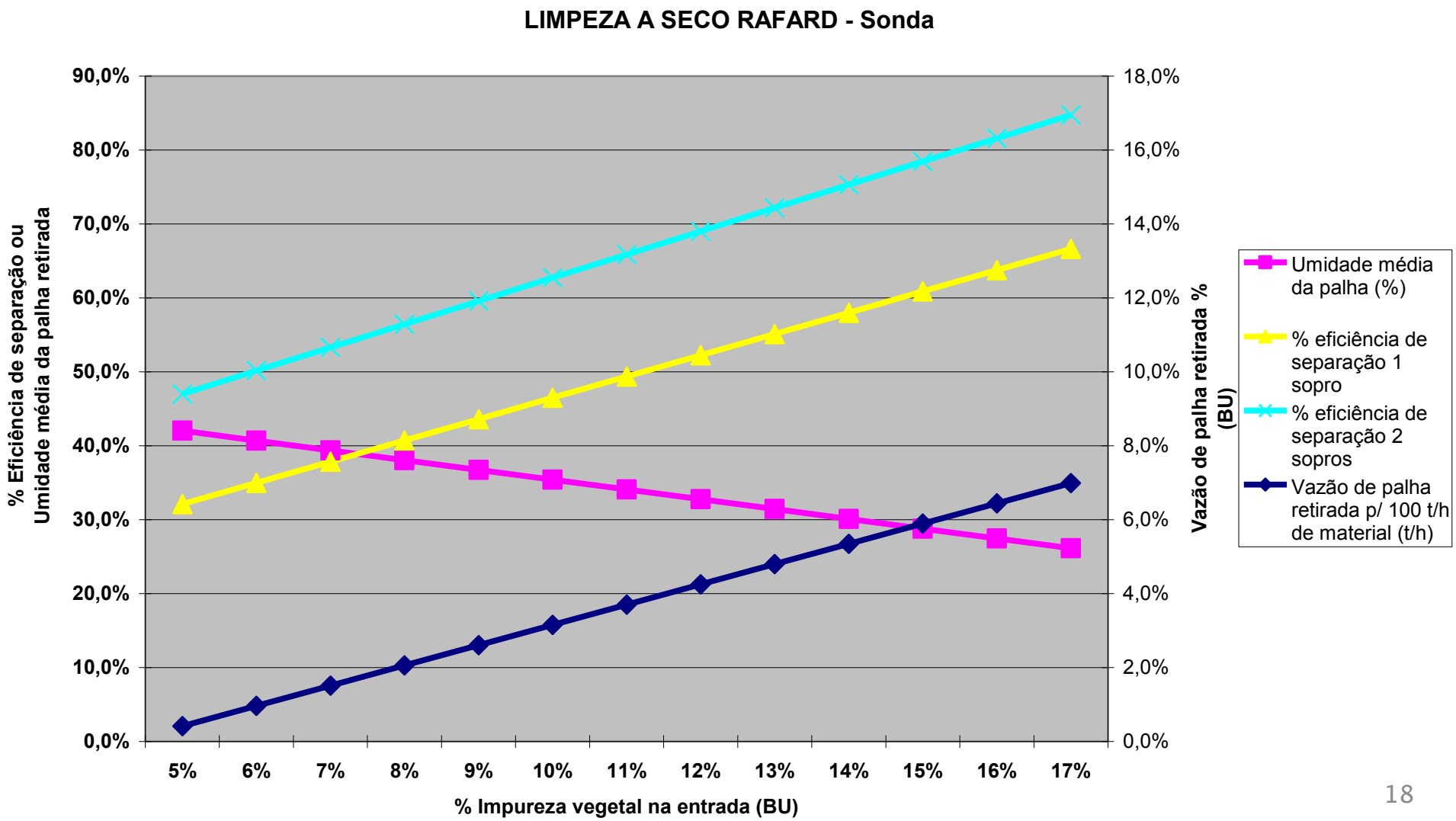
Separation Efficiency X Impurities Level X Sampling Method





Evolution of Separation Efficiency

Separation Efficiency and Trash Moisture

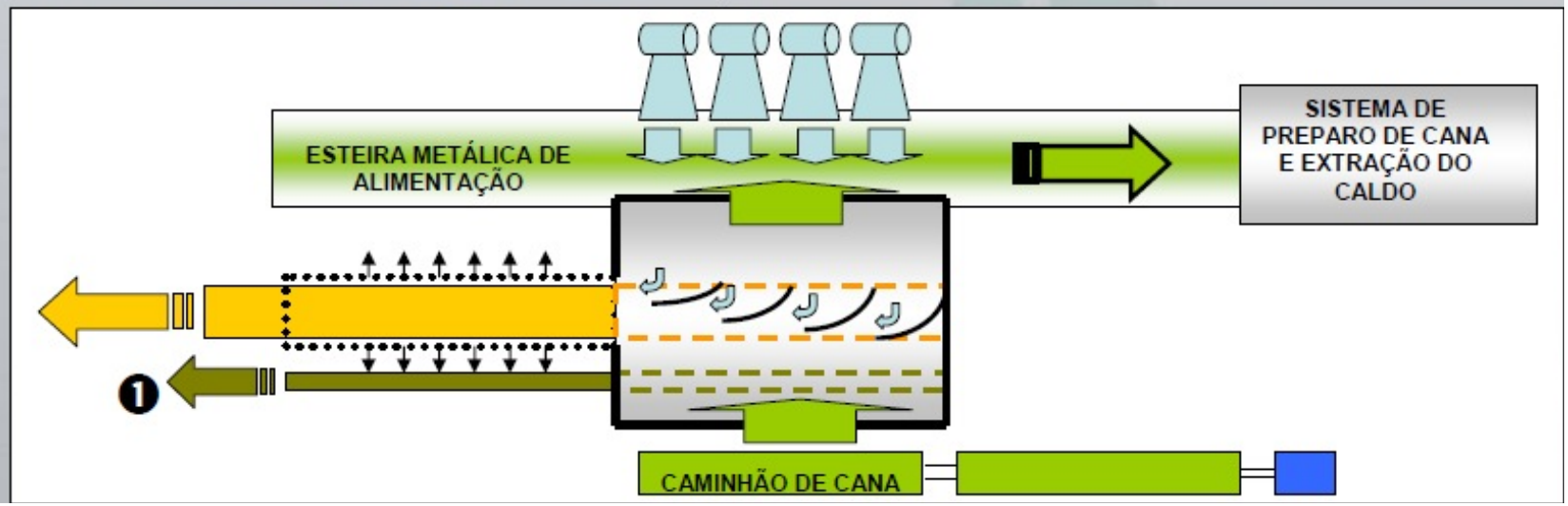


Dry Cleaning Systems Options Today

Up-down Blowing in 45º Feeding Tables

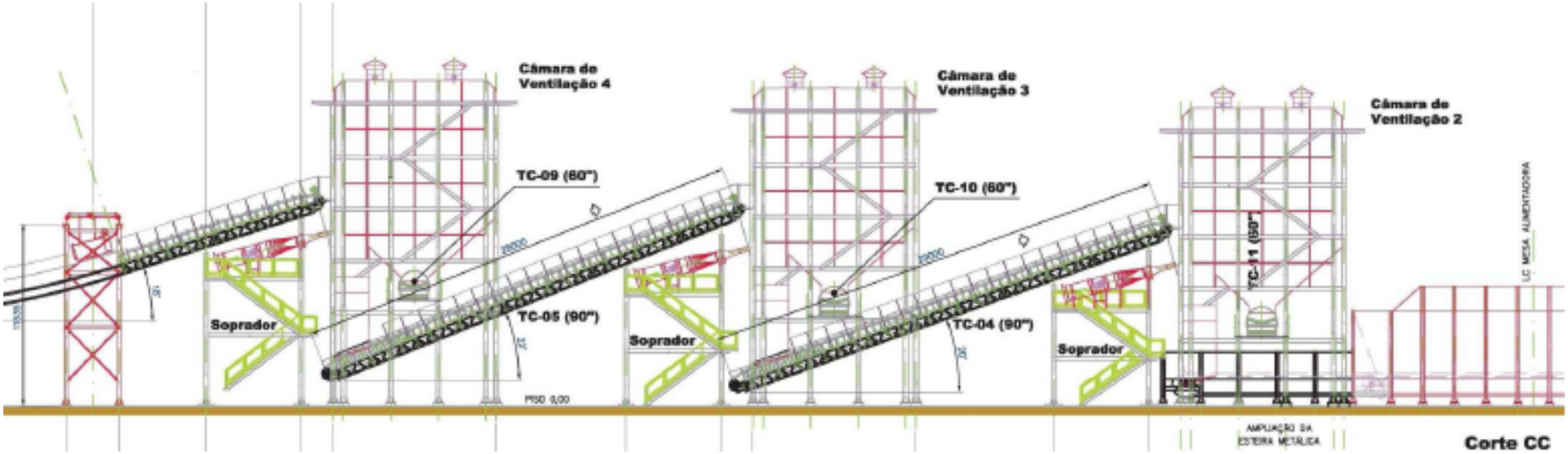


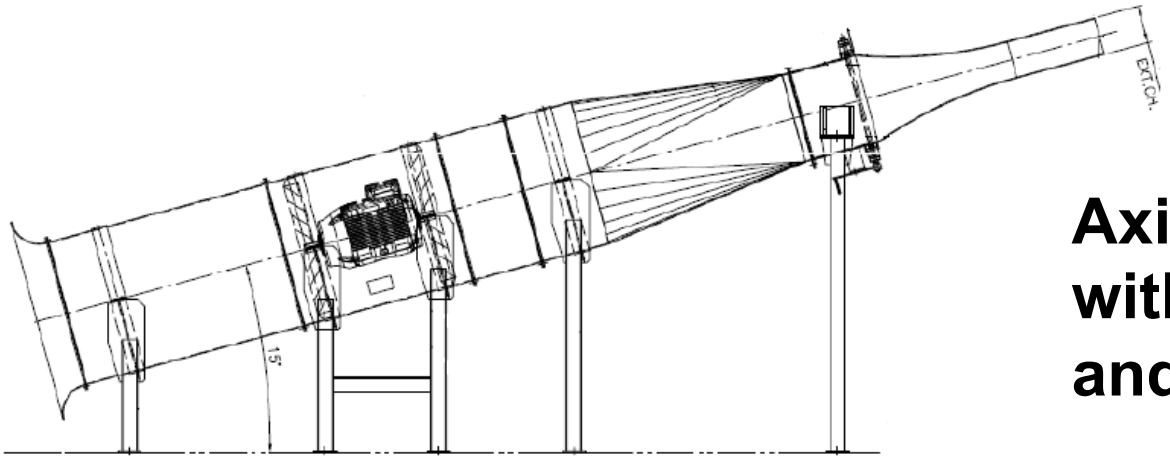




Dry Cleaning Systems Options Today

Up Blowing Between Belt Conveyors – 3 Axial Blowers

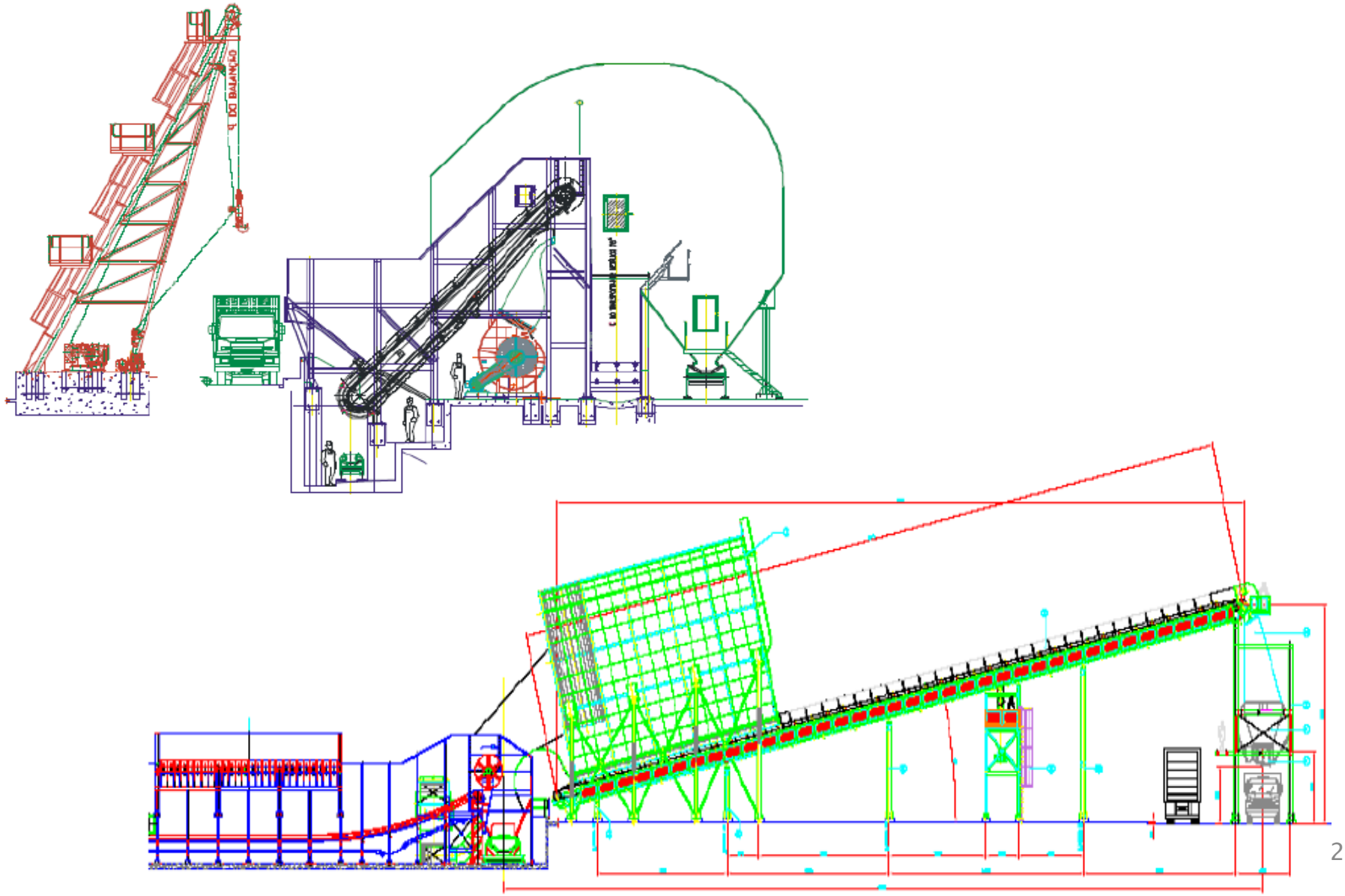




Axial Blowers with variable pitch and speed

Dry Cleaning Systems Options Today

Up Blowing in 45º Feeding Table or Cane Carrier – EMPRAL



Dry Cleaning Systems Options Today

Up Blowing in 45º Feeding Table or Cane Carrier – EMPRAL





Dry Cleaning Systems Options Today

Up-down Blowing in Belt Conveyors – 2 Blowers – COSAN/CTC



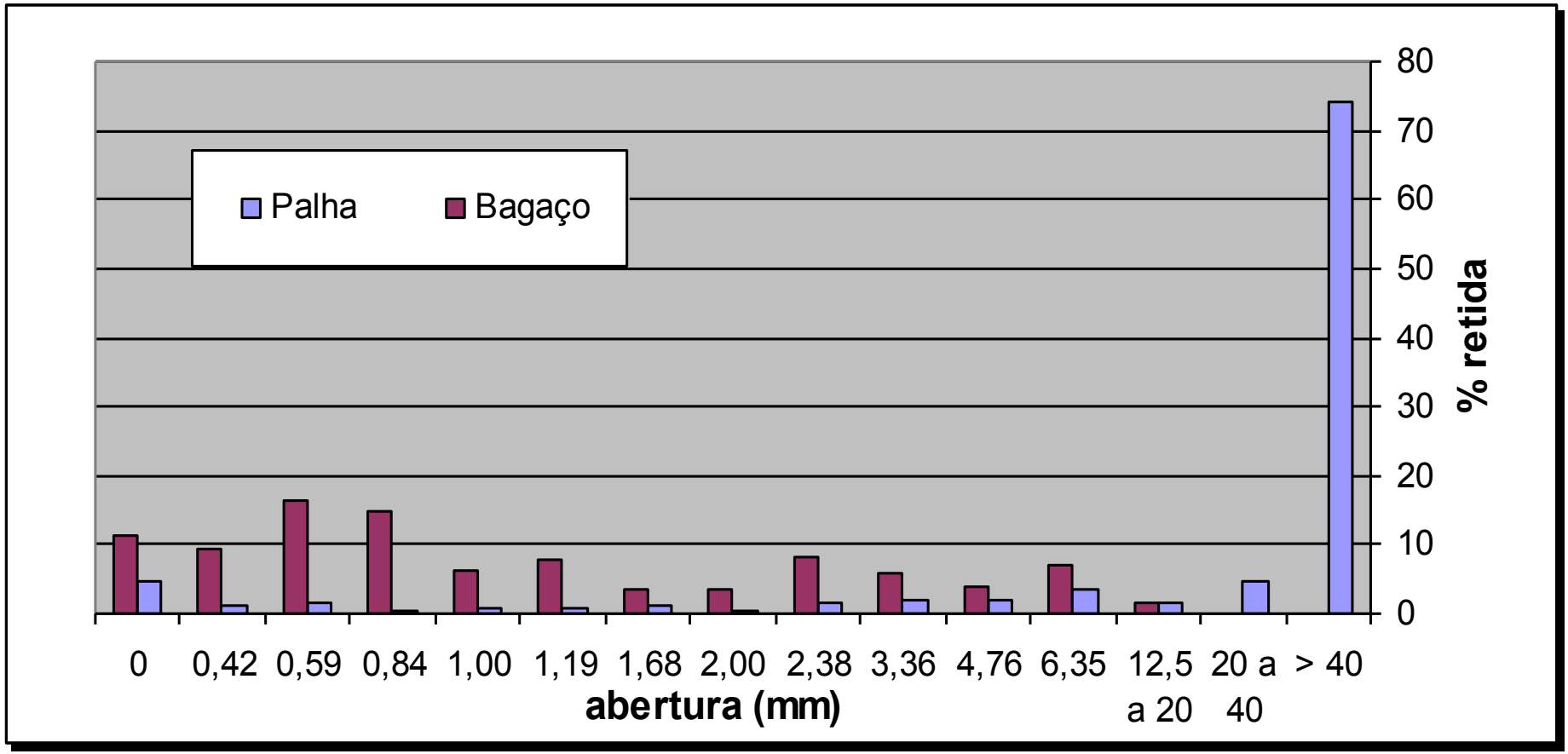
Trash Preparation for Combustion

General Conditions and Issues

- Trash straight to boilers and bagasse to stock
- Bagasse particle size.
- Trash “in natura” particle size.
- Trash particle size reduction by knives X impact hammers.
- Separation of mineral impurities from trash
- Other trash components.

Trash Preparation for Combustion

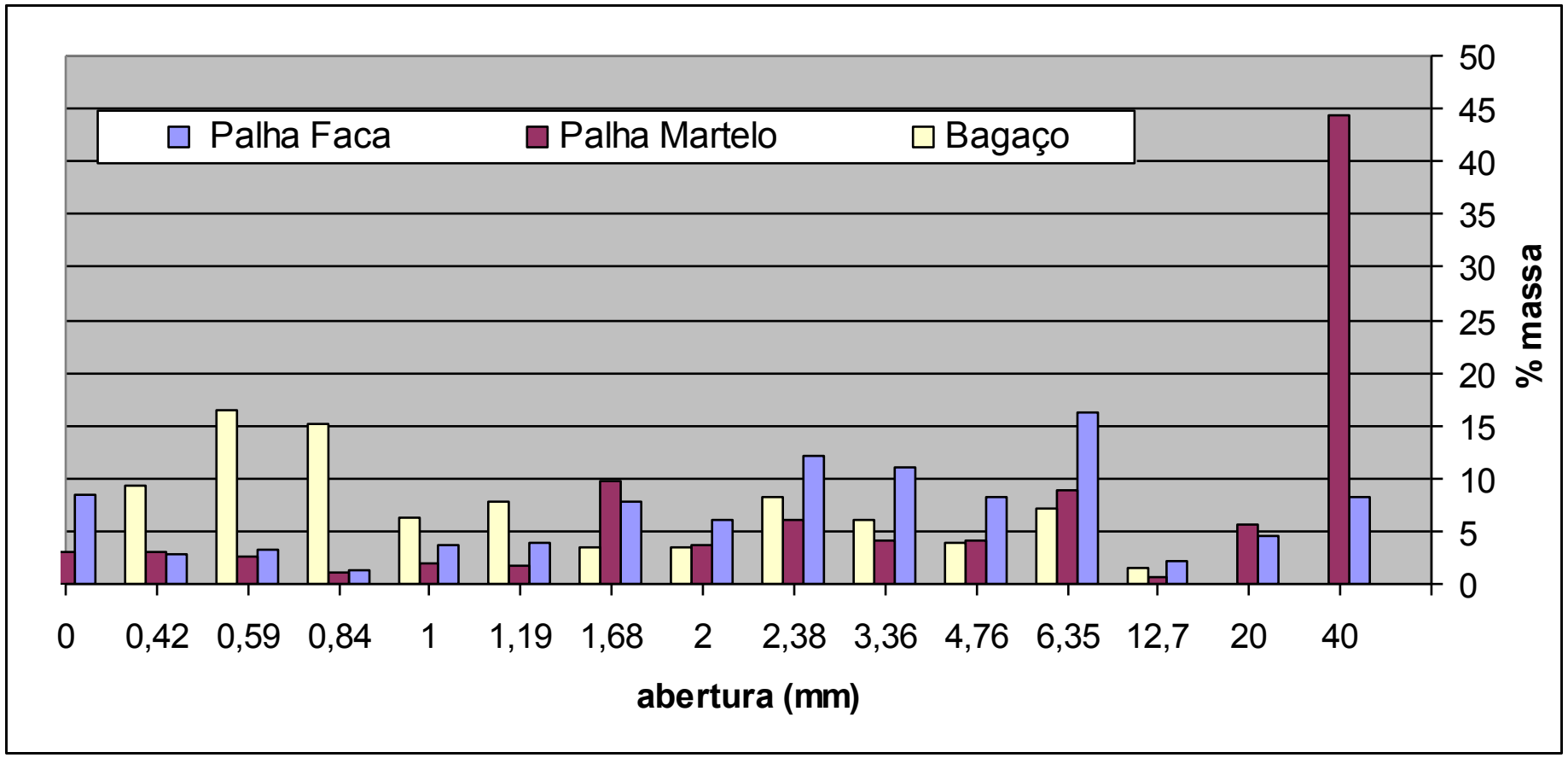
Bagasse and Trash “In Natura” particle Size



Source: CTC Seminar – Cane Dry Cleaning Technology - CTC – 17/05/2007

Trash Preparation for Combustion

Trash Particle Size Reduction – Knives X Hammers



Source: CTC Seminar – Cane Dry Cleaning Technology - CTC – 17/05/2007

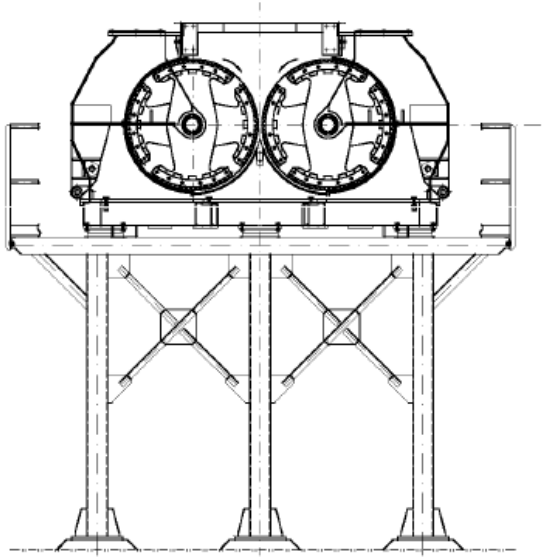
Trash Preparation for Combustion

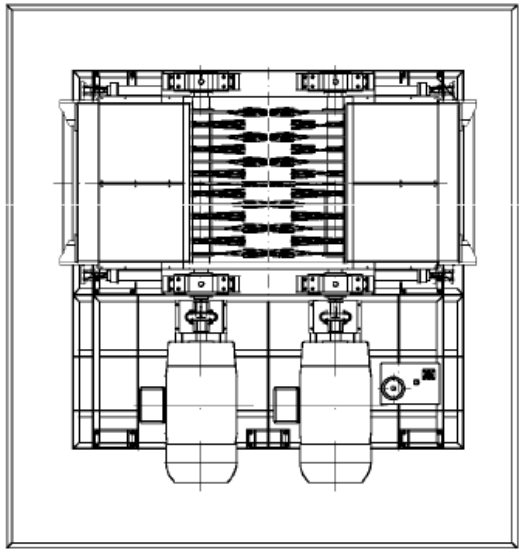
Trash Particle Size Reduction – Knives

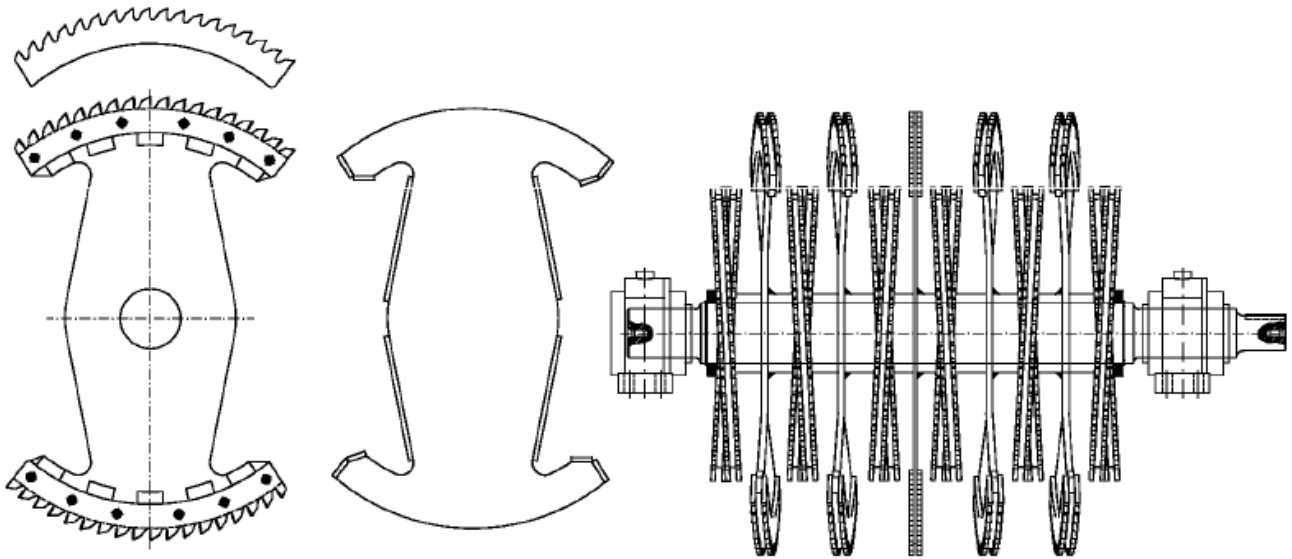


Trash Preparation for Combustion

Trash Particle Size Reduction – Knives







Trash Preparation for Combustion

Separation of Impurities ands Trash Size Reduction – Knives



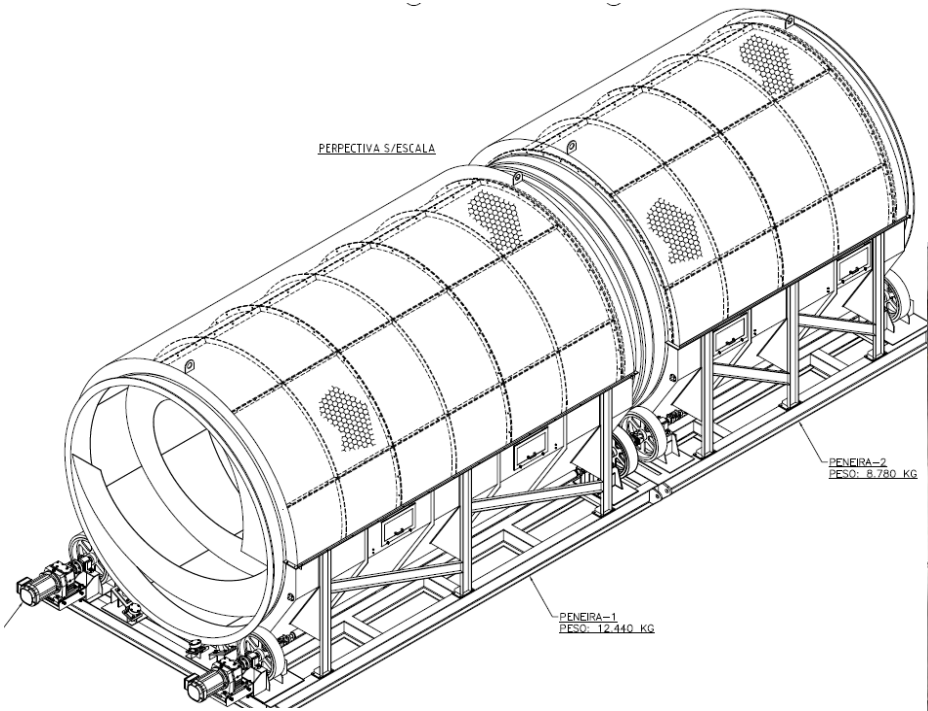






Trash Preparation for Combustion

Separation of Mineral Impurities from Trash – Prior to Knifing

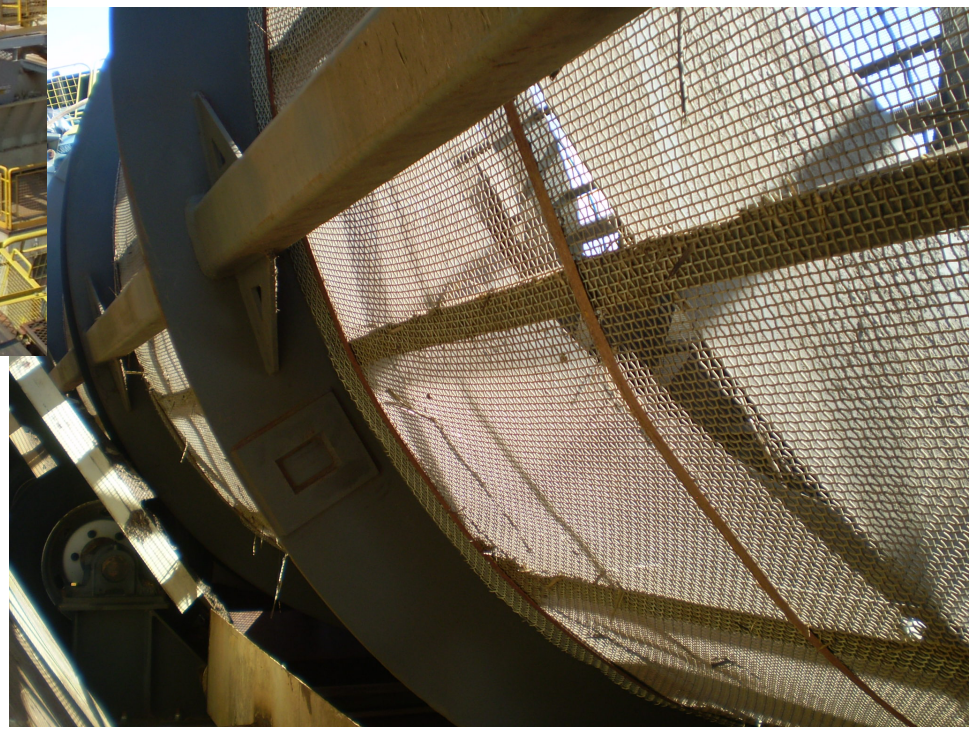




Trash Preparation for Combustion

Separation of Mineral Impurities from Trash – Prior to Knifing





Trash Removal and Preparation at Raízen

Factors to Determine the Choice

- System Efficiency
- Amount of Investment.
- 100 % of Mechanical Harvested Cane.

Trash Removal and Preparation at Raízen

Installed and Estimated Power Consumption – Belt Conveyors

INSTALED AND ESTIMATED POWER CONSUMPTION - COSTA PINTO - 1.000 tch - 13 % TRASH			
QTTY	EQUIPMENT	INSTALED POWER (hp)	POWER CONSUMPTION(cv)
1	METALIC CONVEYOR	125	83
4	BELT CONVEYOR - CANE	425	302
10	BELT CONVEYOR - TRASH	265	212
7	BELT CONVEYOR - MINERAL IMPURITIES	23	18
2	AIR BLOWERS	200	160
2	ROTATING SCREENS - TRASH	30	24
2	TRASH KNIFE	800	240
TOTAL POWER (hp)		1.868	1.039
ESPECIFIC POWER (HP/tch)		1,87	1,04

Trash Removal and Preparation at Raízen

Installed and Estimated Power Consumption – 45º Feeding Tables

INSTALED AND ESTIMATED POWER CONSUMPTION - 45º TABLE - 1.000 tch - 13 % TRASH			
QTTY	EQUIPMENT	INSTALED POWER (hp)	POWER CONSUMPTION(cv)
2	45º FEEDING TABLE	400	264
1	BELT CONVEYOR - CANE	100	71
10	BELT CONVEYOR - TRASH	265	212
7	BELT CONVEYOR - MINERAL IMPURITIES	23	18
8	AIR BLOWERS	800	640
2	ROTATING SCREENS - TRASH	30	24
2	TRASH KNIFE	800	240
TOTAL POWER (hp)		2.418	1.469
ESPECIFIC POWER (HP/tch)		2,42	1,47

Trash Removal and Preparation at Raízen

New Raizen Dry Cleaning Plants









raízen

THANK YOU

Development of Dry Cleaning and Trash Preparation for Combustion in Brazil

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8 – 12 May 2011