K BEŞ GAYRİMENKUL
DANIŞMANLIK
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İSTANBUL - AFYON - TÜRKİYE

clinker section :

1) the feeding size of clinker retarder section :

2) gypsum : type, feeding size, moisture (mixed material section : refers to the other material is added in cement grinding)

3)slag : feeding size, moisture

4) coal ash : powder id our of the electric dust collector, or heap yard block (particle size,moisture)
Note: other kinds of composite materials (such as limestone, etc.), according to the country's resources.
fuel material (slag or other containing water material need baking, this be provided)

5) industrial analysis of coal (volatile, ash content, tixed carbon, calorific value etc.),
particle size, moisture into the factory.
chemical analysis of coal ash
Note:other fuel,it need to provide the type (such as oil, gas, petroleum coke), the composition,calorific value, particle size, moisture, etc.

6) packing section :
bag type : bag weight, need the automatic loading machine or not ?
Bulk Type : library side in bulk, or in bulk at the bottom ?
other built factory conditions :
water : water, water quality, water quantity
electrical : electricity power grid voltage (11 kv or other), frequency (50hz or 60hz)
ichnography, landform geomorphological, geology (design should be according to
geological exploration report) customer need supply the information for the grinding station as follows:

1. elevation, weather etc.

2 Basis of design
2.1 Design capacit____ ton clinker per day

2.2 Plant site condition:
2.2.1 altitude of the site above sea-level:
2.2.2 Temperature
Annual average temperature/year:___ C
Averege temperature in summer:___C
Max. temperature:___C
Min. temperature:___C
2.2.3 Rainfall
Max. rainfall for calendar year:____mm
Max. rainfall for calendar year:____mm
Max. rainfall for calendar year:____mm
2.2.4 Humidity
Annual average relative humidity:____%
Relative humidity for Max. hot monthly mean:_____%

2.2.5 Wind speed

Annual average wind speed:___

10 minute average max. wind speed:_____m/s

2.2.6 Sun light Average sun light time for calendar year:___h/day

2.2.7 Max. freezing soil depth:_____mm

2.2.8 Min. freezing soil depth:_____mm

2.2.9 Annual average thunder days:_____days

2.2.10 Main wind direction

Main wind direction for calendar year summer:_____

Main wind direction for annual average season:_____

2.2.11 Information about the earthquake. thunder and hailstone

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MACHINERY AND BRANDS USED IN ELECTRICAL UNITS

Reducer	– YILMAZ REDUKTOR
Electric Motors	– GAMAK (from 0,06 to 1000KW.EU engines will be used for the engines higher than 1000KW)
Electrical Materials	– OMRON
Contactors	– OMRON, SIEMENS, TELEMEKANIK
Automation	– OMRON (Plc)
Sensors	– OMRON
İnverter	– OMRON
Communication	– OMRON
Encoders	– OMRON
Servo System	– OMRON
Motor Control	– OMRON
Capacitor Load Circuit	– MADE IN TURKEY
Load Relays	– OMRON
Cables	– OF TSE
Thermal Camera Sensitive To Heat	– OMRON
Heat Meters	– OMRON
Silo Level Indicators	– OMRON
Weighing Cells	– ESIT ELEKTRONIK
Load Cell	– ESIT ELEKTRONIK

600 t/d Cement Clinker Production Line

Technical Plan

(Adopt new model five-stage cyclone pre-heater kiln)

İSTANBUL-AFYON/TÜRKİYE

The Product List of 600TPD Cement

NO	Name	Q'TY
I	**crushing**	
1	vibrating feeder	1
2	jaw crusher	1
3	belt conveyor	1
4	compound crusher	1
5	belt conveyor	1
6	Dust Collection	1
7	bucket elevator	1
8	de-iron separator	1
II	**Drying**	
1	tooth roller crusher	1
2	bUcket elevator	1
3	coal injection machine	1
4	drier	1
5	bUcket elevator	1
6	belt conveyor	1
7	Dust Collection	1
III	**Raw material grinding**	
1	automatic batching system	1
2	ball mill	2
3	electric dust collection	1
4	bUcket elevator	1
5	high-effect power concentrator	1
6	draughtfan	1
7	bucket elevator	1
8	belt conveyor	1
9	squama board conveyor	1
IV	**clinker**	
1	feeder	3
2	screw conveyor	1
3	bucket elevator	1
4	screw conveyor	1
5	double-roller blender	1
6	automatic pre water system	1
7	granulating disc	1
8	belt conveyor	1
9	vertical shaft kiln	2
10	glass fiber dust collector	1

11	high pressure roots blower		1
12	V-fine crusher		1
13	squama board conveyor		1
14	bucket elevator		1
15	de-iron separator		1
V	**cement clinker grinding section**		
1	vibrating feeder		1
2	jaw crusher		1
3	bUcket elevator		1
4	automatic batching system		1
5	belt conveyor		1
6	ball mill		2
7	Dust Collector		1
8	bucket elevator		1
9	power concentrator		1
10	draughtfan		1
11	bucket elevator		1
VI	**finished product package**		
1	feeder		3
2	screw conveyor		1
3	bucket elevator		1
4	Rotary Screen		1
5	power concentrator		1
6	eight-nozzles machine	Packaging	1
7	air compressor		1

CONTENS

1. Production scale, production method and cement types

1.1 Production method

Dry-process production method is adopted. Two vertical kiln(Φ3.6×11m) production line with five-stage cyclone pre-heater will be adopted.

1.2 Production scale and capacity

The production capacity is 600t/d for clinker, while 210，000t/a for Ordinary Portland Cement when mixed with gypsum and admixture.

1.3 Cement types

The technology and equipment adopted can produce Portland cement and Ordinary Portland cement whose strengths are 32.5MP, 42.5MP and 52.5MPa, and cement types can be adjusted according to market demand.

2. Requirements for raw materials and fuel

2.1Calcareous material: $CaO \geq 48\%$, $MgO \leq 3\%$, $K_2O+Na_2O \leq 0.6\%$, $SO_3 \leq 1\%$

Firestone or quartz≤4%

2.2 Argillaceous material: silica modulus $n= SiO_2/(Al_2O_3+ Fe_2O_3)=3.0 \sim 4.0$

Alumina modulus $p= Al_2O_3/Fe_2O_3=1.5 \sim 3.5$

$MgO \leq 3\%$, $SO_3 \leq 2\%$, $K_2O+Na_2O \leq 4\%$

2.3 Other raw materials: siliceous correcting material n >4

$SiO_2=70 \sim 90\%$ $K_2O+Na_2O \leq 4\%$

Pressure strength is better less than $1000kg/cm^2$

Iron correcting material $Fe_2O_3 \geq 40\%$

Gypsum $CaSO_4 \cdot 2H_2O>65\%$

2.4 Coal: black coal: vaporizing composition 20～35%, ash≤28%

Sulfur≤3%, low heat value≥22990KJ/kg(≥5500KCa/kg)

2.5 Raw meal: $K_2O+Na_2O \leq 1.5\%$, $CL^- <0.02\%$

Ratio of Sulfur trioxide and alkaline-earth metals oxide:

$S/R=SO_3/0.85K_2O+1.29Na_2O=0.6 \sim 1.0$

3. Main technical characteristics

3.1 This production line adopts suspension pre-heater technology and equipment of current cement industry. With the dependable technology and equipment, great economy benefits may be acquired. New bag filter according to import technology, raw meal homogenizing silo and heat resisting exhauster adopted in this production line can improve the technology greatly.

3.2 The high-efficiency low-resistance five-stage cyclone pre-heater system with high classification efficiency, high heat exchanging efficiency and low system resistance will be adopted at the kiln inlet, so as to increase the output of clinker. By adopting this system, apparent degree of decomposition can reach to90-93%. In order to avoid jam in the high

temperature area such as pre-heater and discharging duct, compressed air blowing device which can blow off powder automatically will be adopted at the bottom cone-shaped outlet, broadened cavity, discharging duct and transition housing of the third, fourth and fifth pre-heaters.

3.3 The following new technology will be adopted at the vertical kiln head:

a. Multi-passage pulverized coal fuel device is adopted.

b. The momentum flow meter regulation system is adopted for pulverized coal weighing and feeding.

c. The high-efficiency shaft cooler will be adopted for clinker cooling.

3.4 Open-circuit raw mill and open-circuit high-fineness cement mill are adopted for grinding. This system is high in running ratio, simple in operation and small in maintenance workload.

3.5 In order to measure up to the technology requirements of the new dry process vertical kiln, control methods for electric and automation control sections should be taken like this: advanced, practicable and reliable control for main production parts, while practicable and reliable for other parts so as to realize the aim of economical and practical in control.

3.6 Great importance has been attached to the environment protection in the plan. In order to measure up to the environment protection standard, advanced and practicable dust collectors are adopted at all dust points.

4. Material balance list

No.	Name of material	Natural moisture(%)	Consumption (t/t·cl)		Material balance (t)					
					Dry			Wet		
			Dry	Wet	Hourly	Daily	Yearly	Hourly	Daily	Yearly
1	Lime stone	3	2.580	2.660	32.26	774.0	2322000	22.16	798	2394000
2	Clay	15	0.446	0.524	5.58	133.8	40140	6.55	157.2	47160
3	Iron powder	5	0.046	0.048	0.574	13.8	4140	0.60	14.4	4320
4	Raw meal		3.072		25.6	921.6	276480			
5	Clinker				25	600.0	180000			
6	Cement				29.16	700.0	210000			
7	Admixture	20	0.258	0.322	3.226	77.4	23220	4.02	96.60	28980
8	Gypsum	5	0.094	0.100	1.18	28.2	8460	0.650	30.0	9000
9	Coal for clinkering	10	0.344	0.384	4.3	103.2	30960	4.80	115.2	34560
10	Coal for drying	10	0.034	0.038	0.426	10.20	2016	0.48	11.4	3420
11	Total coal demand				4.72	113.4	32976	5.28	126.6	37980

Remarks: 1. Annual percentage of utilization of kiln is 82.2%.

2. Raw material proportion: limestone: clay: Iron powder=84:14.5:1.5

3. Cement proportion: clinker: admixture: gypsum=85:11:4

4. Clinkering heat consumption: 3553 kJ/kgcl

5. List of Main equipment

No	Name of item	Model and specification of equipment	Power of motor (KW)	Qty (Set)	Annual running percentage rate(%)
1	Limestone crushing	PE400×600 Jew crusher size input ≤350mm size output 40-100mm Capacity 17-40t/h	30	1	26.2
		PC-108 Hammer crusher size input ≤200mm size output ≤13mm Capacity 20-50t/h	110	1	26.2
2	Raw material grinding	Φ2.4×8m raw mill size input ≤15mm size output≤8~10% (remainder above 4900 hole screen) Capacity 22t/h	570	1	56.6
3	pulverized coal preparation	Φ1.7×2.5m air swept steel ball coal mill Water content of raw coal: 7-10% Outlet water content: ≤1% Fineness: ≤10~12% remainder above 4900 hole screen Capacity 2.5-3.5t/h	95	1	29.0
4	Clinker burning	Φ3.6×11m Vertical kiln Five-stage cyclone pre-heater C_1:Φ2560 C_2—C_3 :Φ2760 C_4—C_5:Φ2940 Capacity 300t/d Heat consumption: 3553KJ/Kg.Cl (850Kcal/ Kg.Cl)	55	2	82.2
5	Clinker cooling	Φ3.6×8.9m shaft cooler :300t/d Capacity 300t/d	55	1	82.2
6	Treatment of waste gas at kiln inlet	Φ3.85×26m circumfluence humidification tower air capacity 70000m3/h b.Heat resisting exhauster air capacity 70000m3/h c.Electric dust collector air capacity 70000m3/h inlet dust concentration: ≤80g/Nm3 outlet dust concentration: ≤100mg/Nm3 η=99.82%	250	1	82.2
7	Cement grinding	Φ2.4×8m cement mill Outlet specific surface diameter of cement: 3200cm^2/g Capacity: 18t/h	570	1	
8	Clay drying	Φ1.5×12m rotary dryer Inlet moisture: ≤20% Outlet moisture: ≤5% Capacity: 3-5t/h	11	1	25.1
9	Cement packing	Fixed 2-spout packer Capacity: 30t/h		1	23.1

6. List of material storage capacity and period

Name of material	Type of storage place	Specification (m)	Qty	Storage capacity (t)	Storage period (day)
Lime stone	Pre-homogenizing silo	Φ4×10	3	2000	
Clay	Shed	12×20	1	1000	
	Pre-homogenizing silo	Φ3×12	2	1500	
Iron powder	Shed	12×15	1	250	
	Pre-homogenizing bin	Φ3x10	2	600	
Raw meal	Round silo (silo)	Φ3×10	1	300	
Clinker	Round silo	Φ4×12	1	2000	
Admixture	Round silo	Φ4×12	1	1000	
Gypsum	Pre-homogenizing bin	Φ4	1	50	
Cement	Round silo	Φ4×12	2	600	
	Finished product store	16×30	1	1400	

7. Brief introduction of process procedure

7.1 Limestone crushing

The limestone block will be unloaded into hopper by mineral mountain conveyance vehicle, and crushed by PE400×600 Jew crusher and PC-108 hammer crusher. Crushed limestone will be fed onto the pre-homogenizing limestone silos by bucket elevator.

7.2 Raw material drying, storage and blending

Clay from stockpile will be dried by Φ1.5×12m rotary dryer and fed into the 1-Φ3×10m raw material blending silo by bucket elevator. Material blending will be set as following: three Φ4x10m silo for limestone, two Φ3x12m silo for clay, and two bin for iron powder. Speed governable belt balance will be used at the bottom of material blending silo/bin. Raw meal will be blended according to the requirements and fed onto the raw mill by belt conveyor. In order to reach the optimum raw meal modulus, raw meal quality will be controlled by automatically proportioning computer system.

7.3 Raw meal grinding

Proportioned raw material will be fed onto the raw mill with size of Φ2.4×8m. Finished product ground by mill and collected by dust collector will be fed onto the raw meal homogenizing silo. Hot air for raw mill drying is supplied by hot air furnace.

7.4 Raw meal homogenizing and kiln feeding

Raw meal out of the raw mill will be fed onto the raw meal homogenizing silo (size: Φ3×12m) by bucket elevator and distributor. Homogenized raw meal will be fed onto the raw meal weighing bin by silo bottom pneumatic discharging device and bucket elevator. The raw meal weighed by speed governable belt feeder will be fed onto the pre-heater at the kiln inlet by air slide and bucket elevator.

7.5 Kiln inlet, kiln middle and kiln head

A five-stage cyclone pre-heater system will be adopted at the kiln inlet. Pre-heated raw meal will be fed into the vertical kiln (Φ2.8×11m). Pulverized coal will be sent to kiln by measuring system and multi-passage burner. Clinker out of the kiln will be cooled by Φ2.5×25m single-tube cooler, and fed onto one clinker horizontal silos (16×30m) by bucket-chain conveyor.

7.6 Waste gas treatment of kiln inlet

7.7 Raw coal storage and pulverized coal preparation

Outsourced raw coal will be stored in the shed, fed into mill feeding bin by bucket elevator and belt conveyor and then fed onto air swept coal mill (Φ1.7×2.5m). Pulverized coal out of the mill will be separated by dynamic air separator. Finished product after collected by anti-explode bag filter will be fed onto pulverized coal bin. Hot air for coal drying will use kiln head waste gas. And a spare hot air furnace will be set.

7.8 Clinker and admixture storage

This section will use two round clinker silos with the size of Φ4×14m, one admixture silo with the size of Φ4×14m

and one gypsum silo with the size of Φ4m. Speed governable electrical belt balances will be used at the bottom of each silo. The clinker, gypsum and admixture will be fed onto the cement mill by belt conveyor after accurately proportioned according to the cement modulus requirement.

Outsourced gypsum block will be stored in the open stockpile, crushed by PEX250×750 fine crushing type crusher, and fed onto the Φ4m gypsum silo by bucket elevator. Admixture from the stockpile will be fed onto the Φ4×12m admixture silo.

7.9 Cement grinding

After material blending, clinker, admixture and gypsum will be fed into the open-circuit high-fineness cement mill (size: Φ2.2×11m; capacity: 16t/h).

Product from this system has reasonable size grade and large specific surface area and it complies with fineness requirements. Finished product will be fed onto cement silos by chain conveyor and bucket elevator.

7.10 Cement storage and packing

two silos (size: Φ4×12m) will be used for cement storage. There is one silo bottom bulk loading machine. Cement from the mill will be fed onto cement silos by bucket elevator. At bottom of cement silos, screw conveyor is used to send cement to the packing system.

A fixed 2-spout packer (capacity: 30t/h) will be used for cement packing. This packer is of reliable performances. Bagged cement will be sent into the finished product store by belt conveyor to be transported outside.

8. Estimate list for project investment

9. List of main technology economy parameters

No	Name of indexes	Unit	Quantity
1	Production scale and product types		
	Clinker	t/a	180000
	Cement	t/a	210000
2	Scale of main machine		
	Vertical kilnΦ3.6×11m	set	2
	Raw millΦ2.2×7.5m	set	2
	Cement millΦ2.4×8m Open-circuit	set	2
3	Total weight of process equipment	ton	1500
4	Installed power	KW	4000
5	Production water consumption	m^3/d	2000
6	Net production water consumption	m^3/d	500
7	Total numbers of staff	person	120
	Where: production workers	person	100
8	Labor productivity	Per ton Cement person/year	1750
9	Heat consumption of clinker burning	KJ/kg·cl	3553
10	Construction period	mounth	14
11	Period to reach the required production capacity	mounth	6

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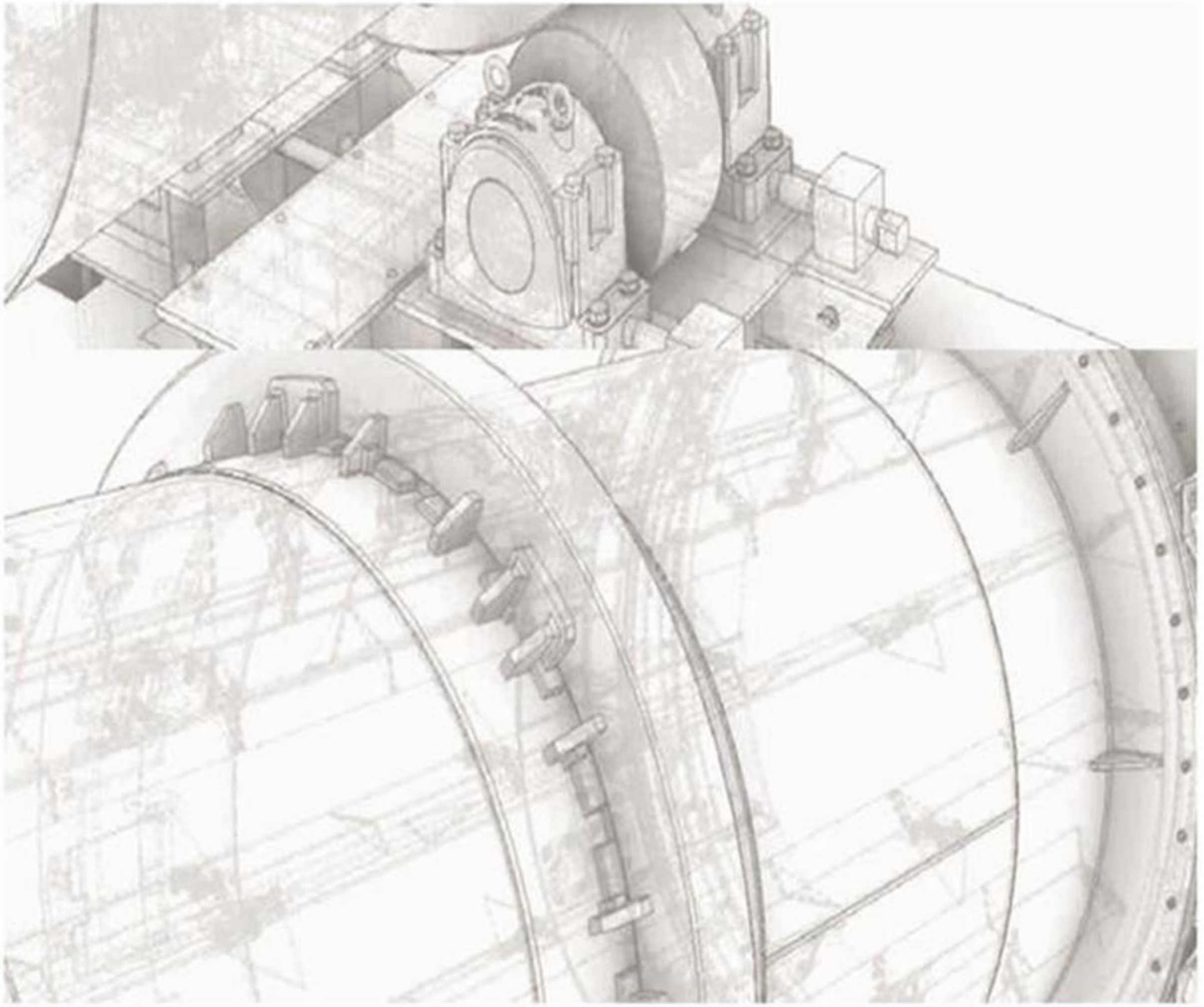

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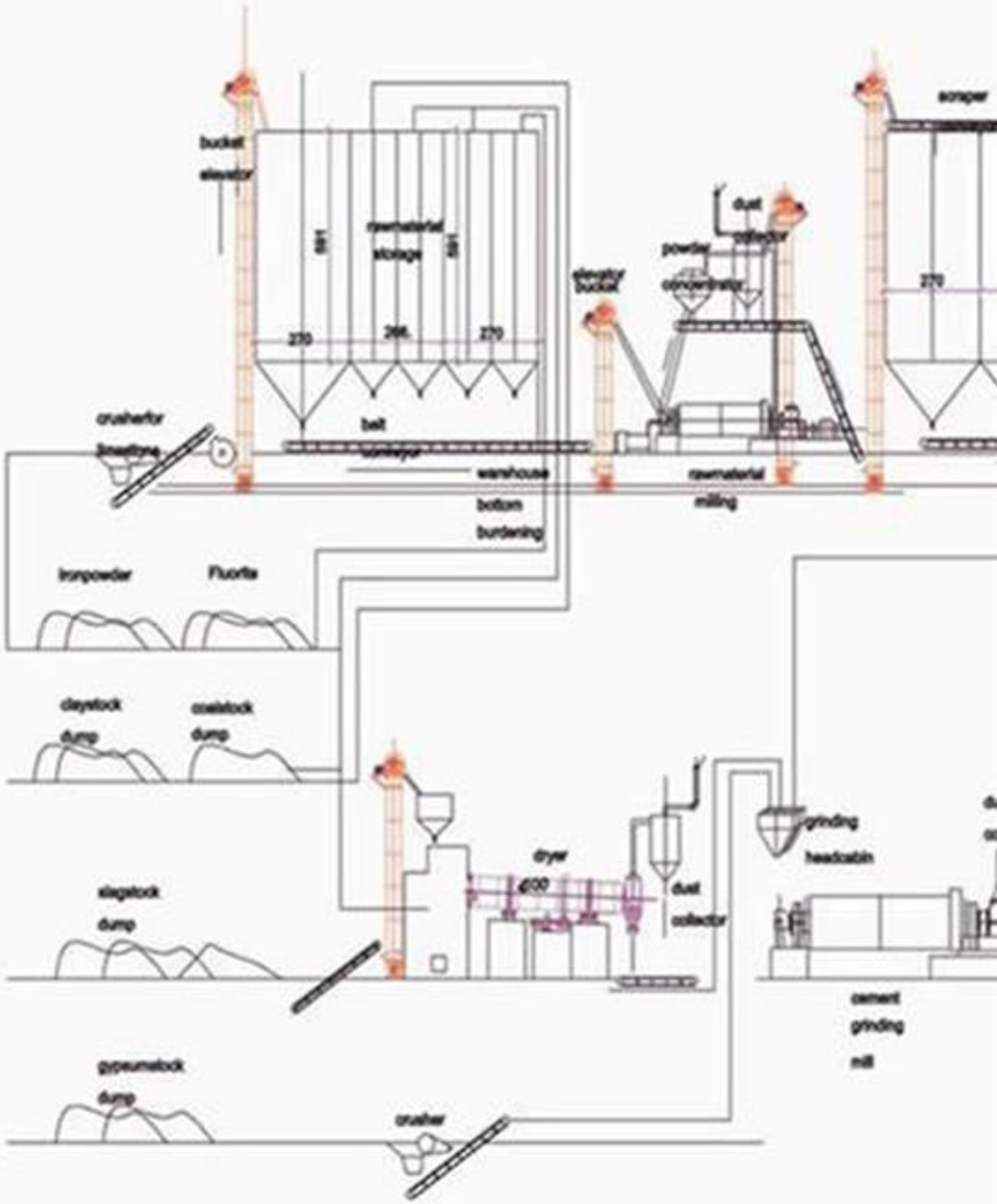
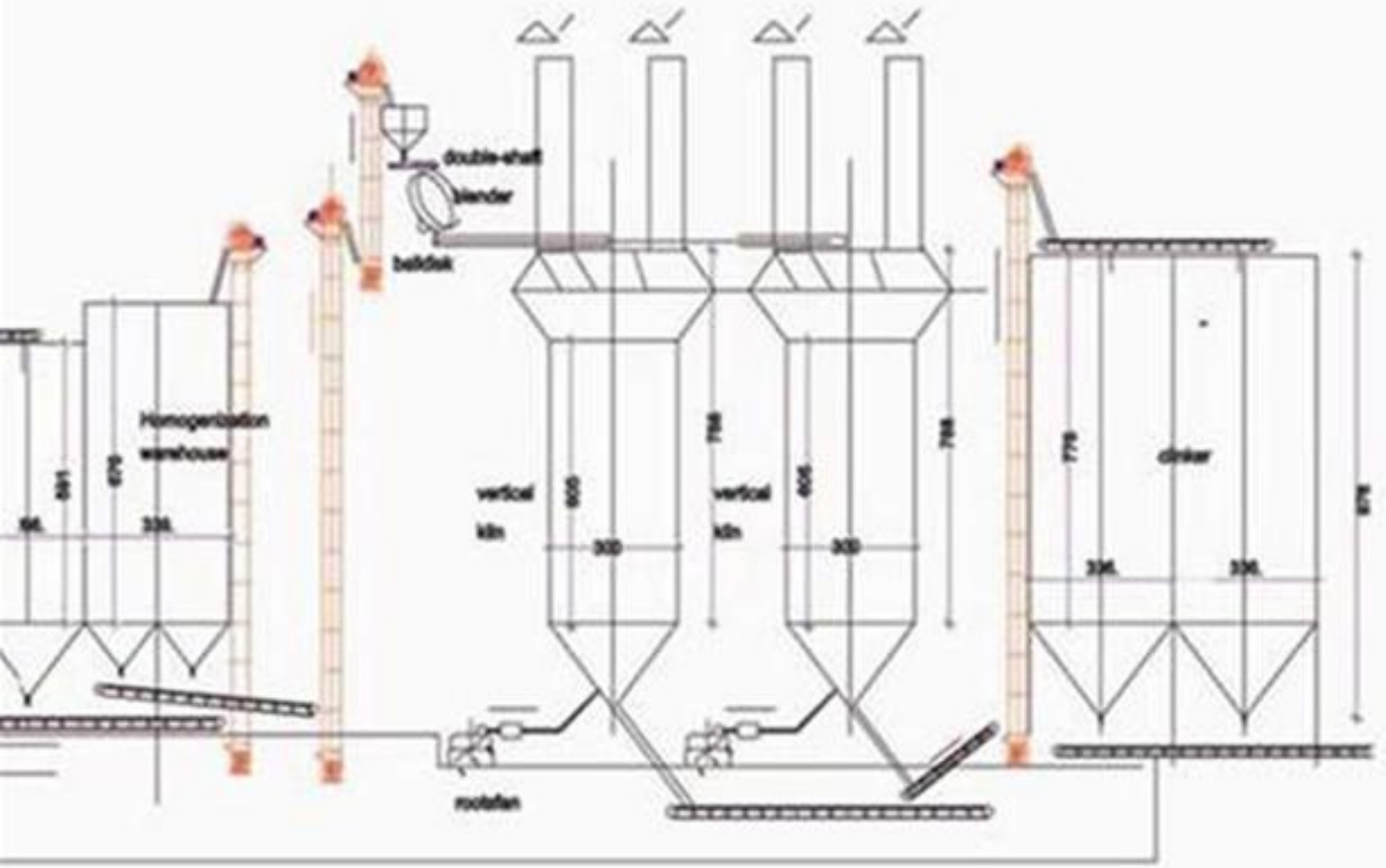
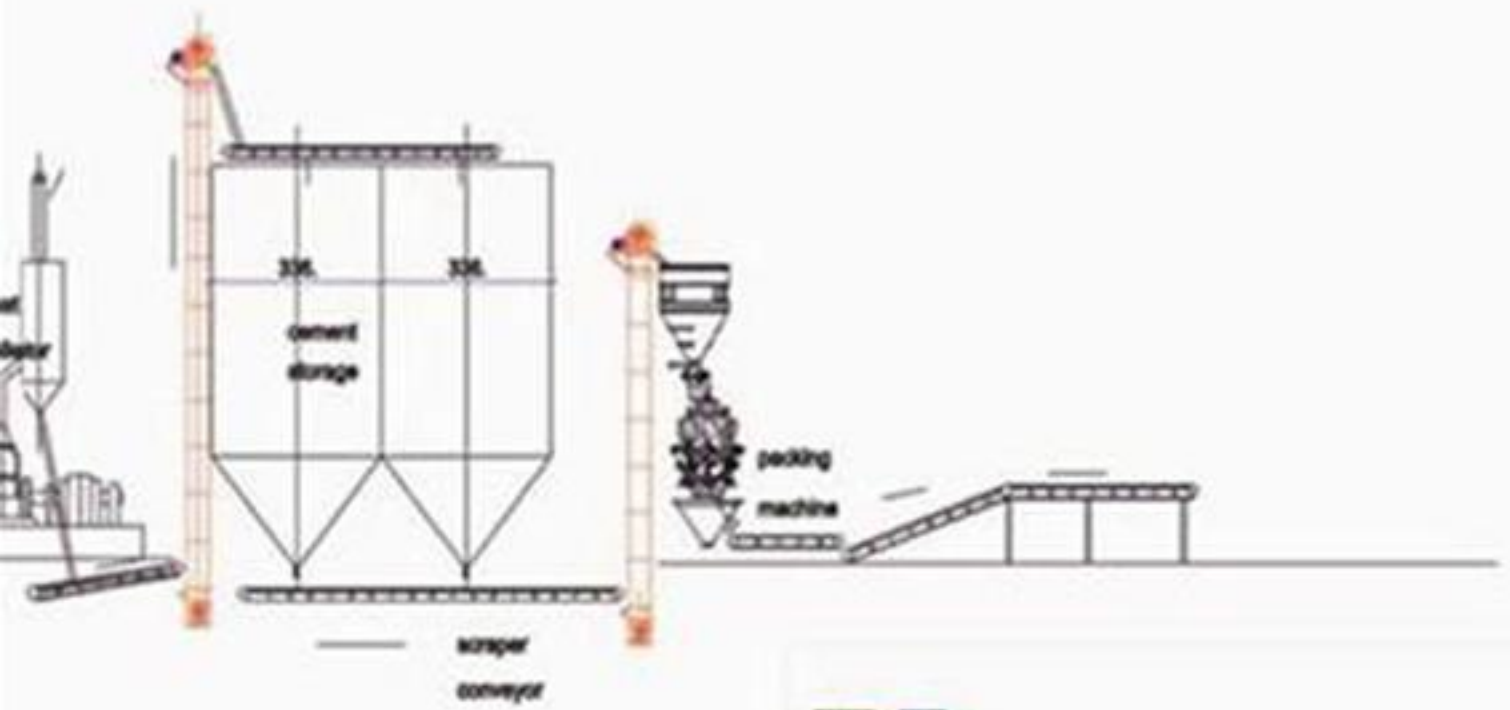


600T/GÜN ÇİMENTO FABRİKASI AKIŞ ŞEMASI





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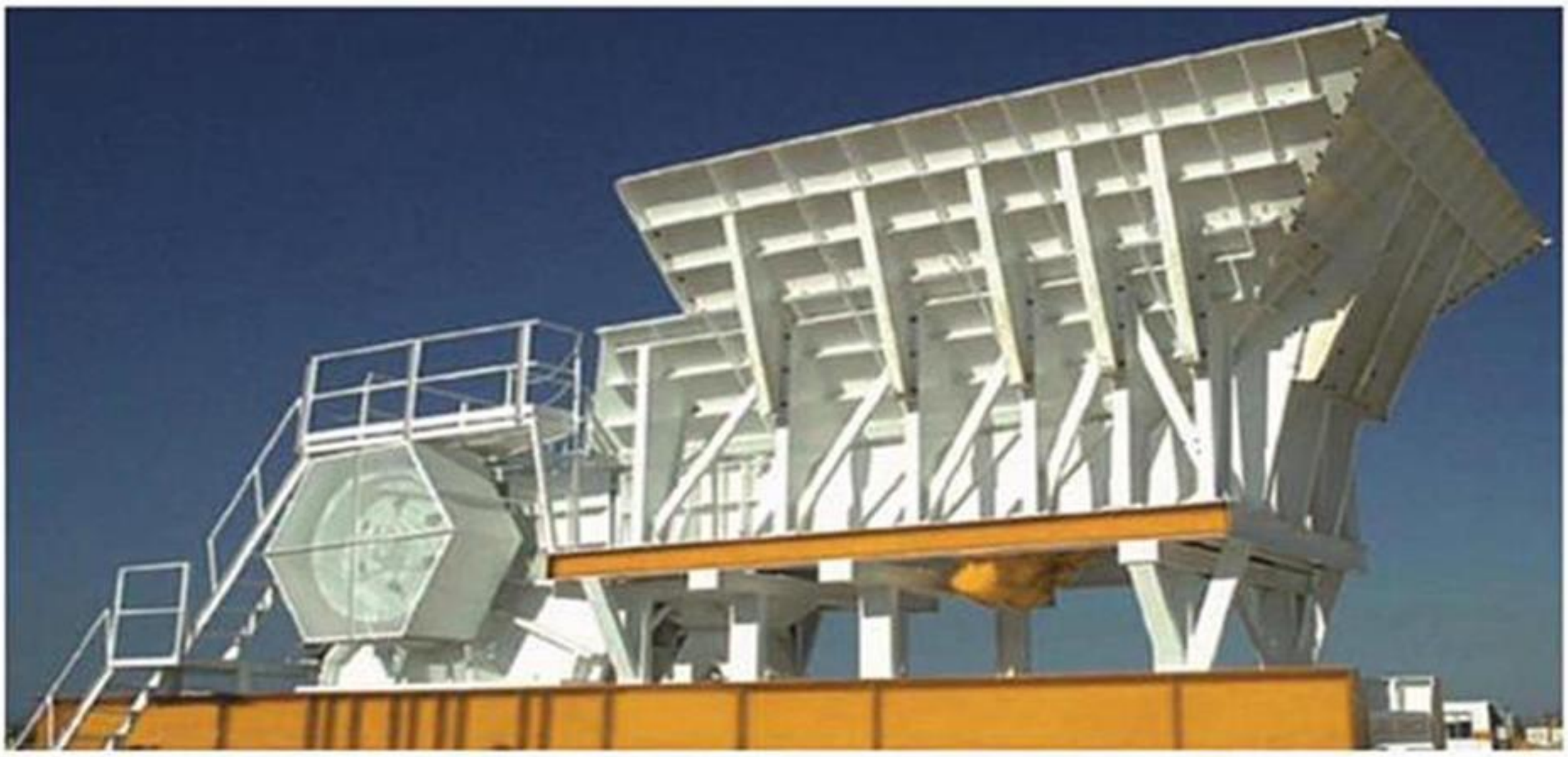
Stone Crushing Konkasörü



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Taş Kırma Konkasörü

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