Empower the Energy Team: Engaging Process People in the Program

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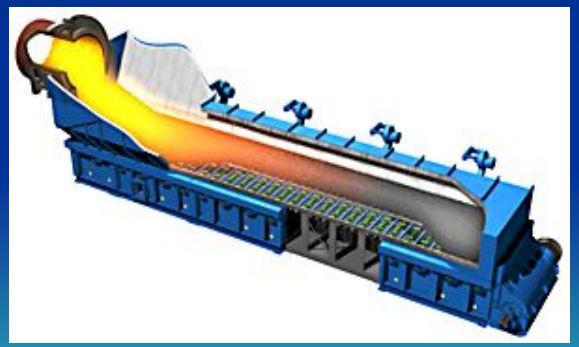

Process Energy Management

OVERVIEW

- Company Background
- Cement Process
- Energy Program
- Process Energy Team
- Initiatives
- Benefits
- Challenges
- Results

Process Energy Management

Company Background

- Founded in 1891
- Producer of Cement, Concrete and Aggregates
- Recent merger with sister company – Glacier NW
- Facilities on West Coast from Alaska to California including Nevada
- 2000 Employees
- ~$1 Billion Annual Sales

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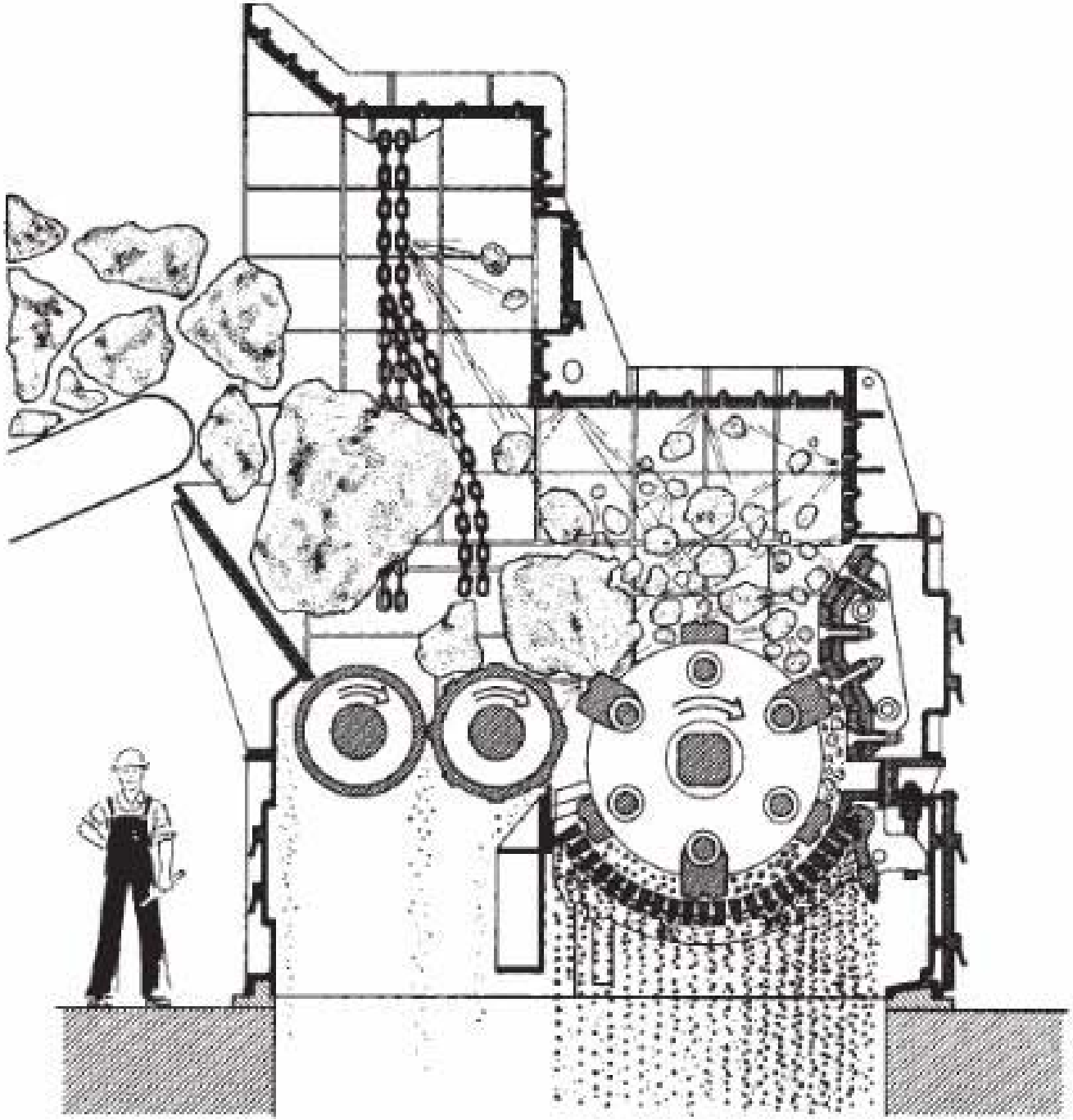
Cement Process

- Energy intensive process – Conversion of car-sized rock to fine talcum powder

"Passing a mountain through the eye of a needle twice"

- Mining, crushing, blending, grinding, heating (3000 deg. F), cooling, conveying, grinding & shipping
- Energy as much as 30% of cost – 50% variable costs
- Typical power demand 22-27 MWatts
- Coal is primary fuel

Crusher



Vertical Mill

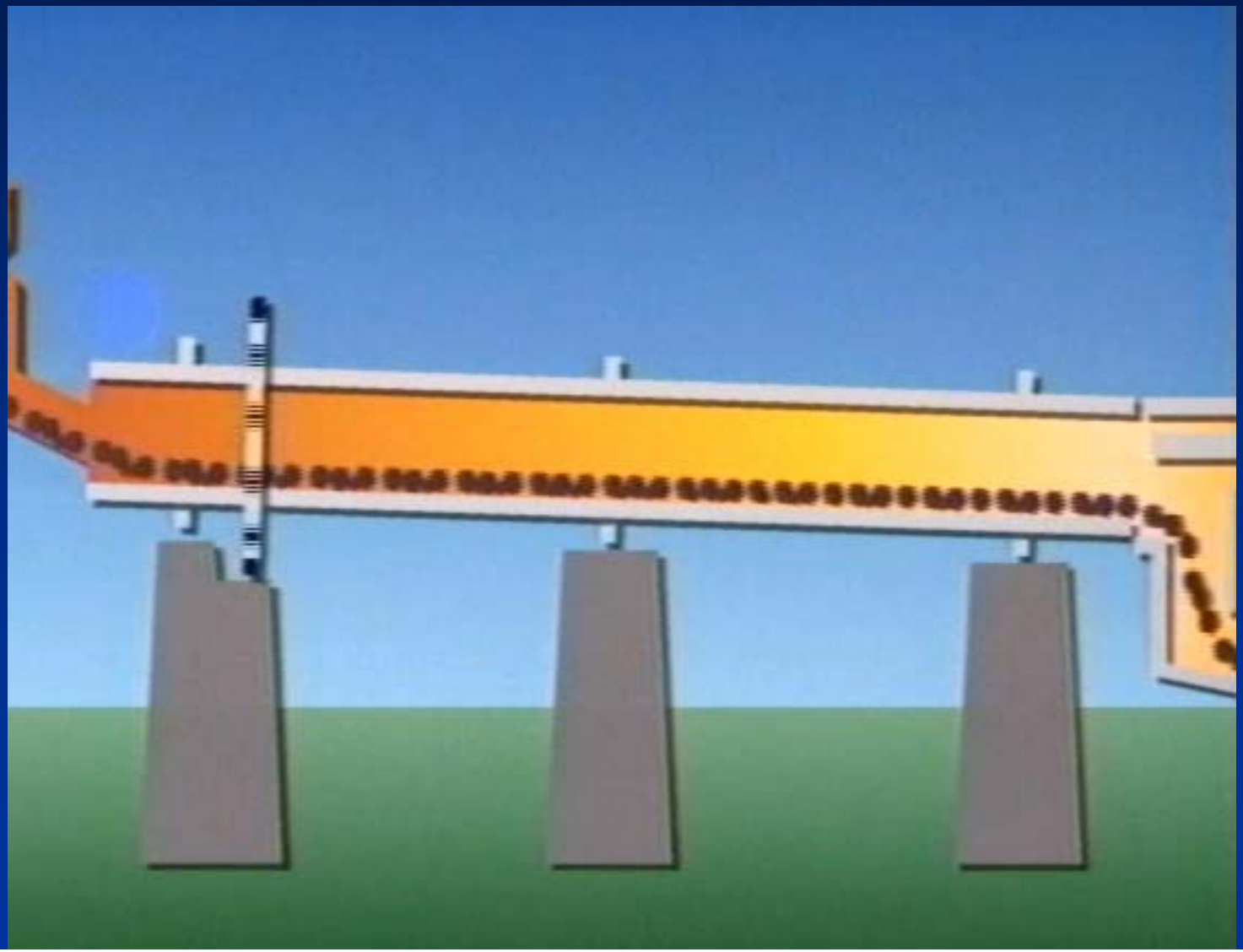
Preheater-Precalciner Tower & Kiln

Preheater-Precalciner Tower

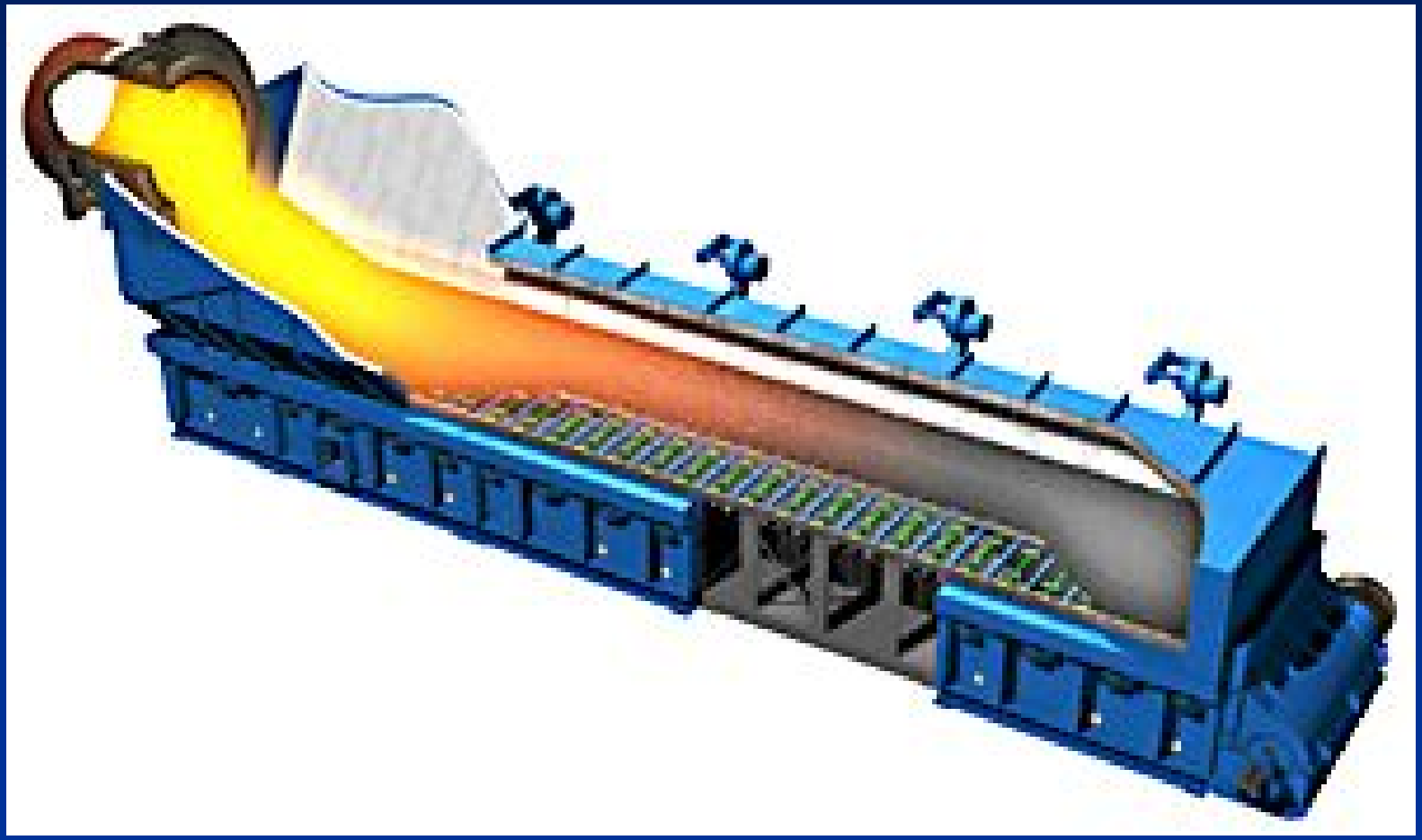
- Air flows up
- Feed flows down & into Kiln

Material flows through rotary Kiln

Temperatures may reach 3000 deg. F



Clinker is formed in the Kiln and cooled in the Clinker Cooler




Finish Mill
SAFETY START
WARNING WHISTLE
1 LONG BLAST
FINISH MILL EQUIPMENT
2 SHORT BLASTS
RAW MILL EQUIPMENT

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Energy Program

- Formal program created in 2003
- Corporate Energy Team
  - Meets every 6 weeks at various plant sites
- Local Energy Teams
  - Meet with plant departments
- Process Energy Team
  - Performs process audits
- Management & Plant Support

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Process Energy Team

- Reviewed Energy Star LBNL Cement Guide – mostly large capital projects identified
- Created team of Process Engineers from each cement plant & corporate
- Goals: Reduce energy costs & emissions i.e. maximize performance of existing equipment
- Met with plant managers & process engineers to develop project list – “Best Bang for the Buck”
- Developed audit schedule
- First finish mill study in January 2005

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Initiatives

- Audits/detailed system studies
- Benchmarking – ENERGY STAR EPI
- Gather process & energy data & review with plants and energy team – explain excursions & trends
- Optimize equipment run times
- Perform/manage Plant-wide Assessments - DOE
- Review new technology – implement pilot programs e.g. vibration sensor on mills
- Apply for rebates


BIGGE
BIGGE
BIGGE
THRU

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Audits

- Take measurements – air flow, temperature, pressure, heat balance
- Review process and operational data
- Establish baseline operations
- Validate field instruments and scales
- Evaluate tuning & controls
- Improve process efficiencies – grinding, fuel
- Reduce process heat losses

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Audits (cont'd)

- Optimize chemistry
- Improve quality control
- Develop reports with recommendations
- Perform follow-up audits

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Example Audit:

Colton D4 finish mill system study in January 2005

- Identified several process opportunities
  - Mill sweep and high mill temperatures
  - Separator adjustments/tuning
  - Plugged screens inside mill
  - Ball charge gradation
  - Scale calibration
- $200,000 per year annual power savings identified
- Low capital cost to implement
- Improvements in progress

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Benefits:

- Tangible
  - Reduce energy consumption & emissions
  - Improve production efficiency
  - Improve process engineering skills
- Not so “concrete”
  - Sharing information/ideas between plants
  - Seeing other plants often inspires new ideas
  - Learning from peers
  - Common solutions to common problems
  - Friendship/camaraderie leads to better communication

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Challenges:

- Production pressures
- “Not enough time”
  - Routine duties
  - Special assignments
  - Shifting priorities
- Resistance from plant personnel – “We’ve already looked at that”
- Pride of “ownership”
- Defining the role of the plant Process Engineer

Management commitment and support alleviates these challenges

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Results:

- 4 process audits performed to date
- ~$500 K/yr. of opportunities identified
- Several process improvement projects underway
- CPC has been approved for > $1.3 million in rebates for process improvement projects
- Process energy data review is formalized
- Energy costs mandate continuous process evaluation & improvement

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CHANGE FOR THE BETTER WITH ENERGY STAR

PARTNER OF THE YEAR 2005


I can save how much money by conserving energy???

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QUESTIONS?