

# Sludge Management

Dr. John T. O'Connor, PE

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# Vacuum Drum Filter

- Three filters operate 30 total hours per day
- Sludge: 20,000 gallons per day at 9% solids

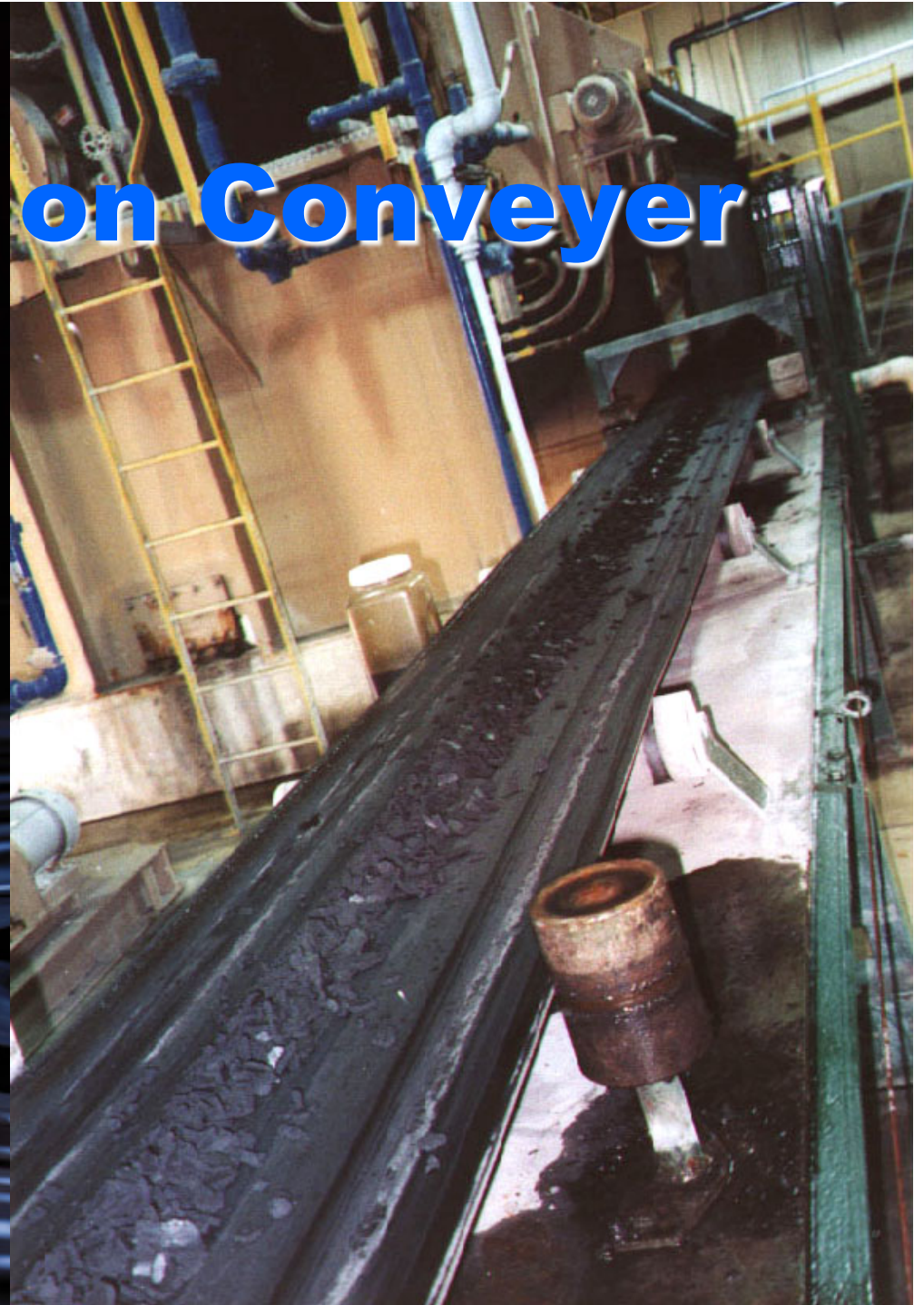


# Filter Cake

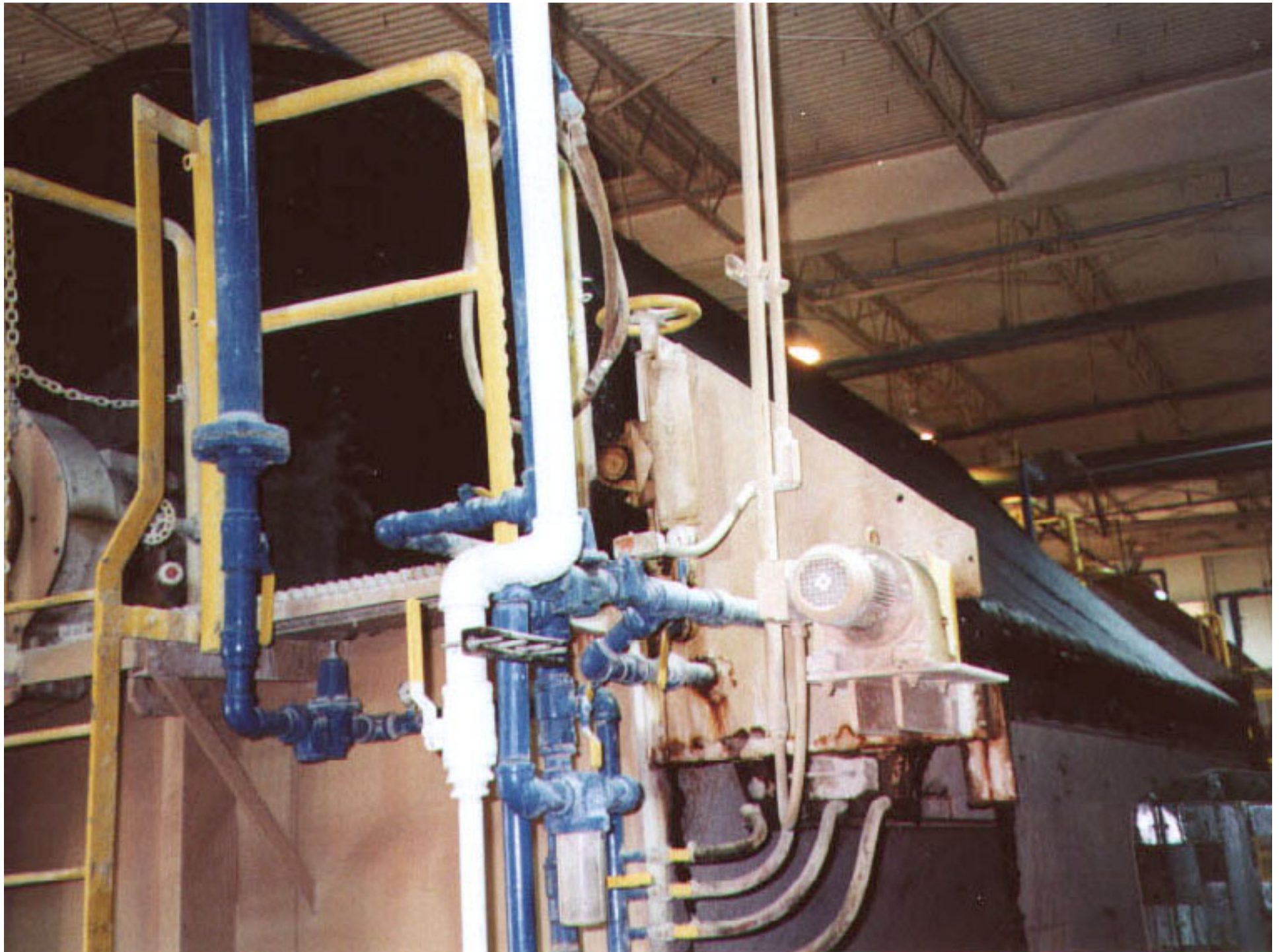


# Filter Cake on Conveyor

- Solids increased from 9% to 27%
- Three-fold sludge volume reduction
- 29 cu. yards/day







# Sludge Thickening

- Gravity
- Flotation
- Centrifugation

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# Sludge Conditioning

- Elutriation
- Lime
- Ferric Chloride
- Polymer

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# Sludge Conditioning

The image shows a vertical industrial machine, likely a sludge conditioner, with a hopper at the top and a series of horizontal mixing blades or screens below. It is flanked by two large green vertical pipes. At the base of the machine, there are several bags of 'ROTARY HYDRATED LIME'. The machine has two 'DANGER' warning labels on its upper section. The background is a dark industrial setting.

## Lime Feed

- 1,300 lbs. per day
- \$10 per dry ton of sludge treated

## Filtrate

- pH 11
- 1.4% solids

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# **Sludge Conditioning**

## **Filter Leaf (Buchner Funnel) Test**

- **Volume of Filtrate**
- **Suspended Solids in Filtrate**
- **Cake Solids**

## **Capillary Suction Time**

- **200 seconds (Raw Sludge)**
- **10 seconds (Conditioned)**

# Sludge Dewatering

- Vacuum Filter
- Pressure Filter
- Drying Bed

A high-speed photograph of a water droplet hitting a dark surface, creating concentric ripples. The droplet is captured mid-splash, with a small crown-like shape at the point of impact.

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# Sludge Disposal

- Land Application 39%
- Landfill Burial 35%
- Marketing 13%
- Incineration 1%
- Composting, Other 12%

# Sludge Heavy Metals

	Zn	Cu	Cd
	ppm, dry weight		
Dayton, OH	8,390	6,020	830
Monterey, CA	3,400	720	< 200
Cincinnati, OH	9,000	4,200	< 40



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