Metering Rubberized Asphalt

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Presentation Overview

- Cold Start-up Problems
- Common Metering Problems
  - Entrained Air
  - Pump pulsations and cavitation
  - Helical Gears and Phased Balanced Gears
- Summary and Conclusions
Understanding the Problem

Heat and Pressure for Start-up
- Most pumps have *non-heated* relief valves
- RV inlet passage full of cold asphalt
Non-Heated Relief Valve
Non-Heated Relief Valve
Heated Relief Valve
Mass Flow Meter

- Not designed for asphalt originally
- CMF300A - 662°F rating
- Lacking adequate method to heat meter
  - Internal wires and solder
Heat and Pressure Solution

CMF-300A Mass Flow Meter

Heated Sections shown in Red

Heat Blocks

Heated Relief Valve

Mass Flow meter is insulated with thermal cover (not shown)
Liquid Noise

- Entrained Air
- Cavitation
- Pump Pulsations
- How the meter works
  - Tuning Fork
  - Drive Coil
  - Pick Off Coils
Liquid Noise

Pick Off Coils
Entrained Air

- Most common cause of metering problems
- Creates an imbalance
- Determine by observing Drive Gain
- Leaks
  - Viton® o-ring port connection
Pump Pulsations and Cavitation

- Positive displacement pumps inherently create pulsations
- Directly related to number of gear teeth
- Adverse effects on Mass Flow meters
Pulsing Flow from Pumps

Rotational Angle / Discharge Rate
Discharge of One Revolution
Phased Balanced Gear
Helical Gears