SANDtrac™ Velocity Profile System

CiDRA®

Data Sheet

Sandbed Detection

CiDRA's clamp-on *SONARtrac*® flow technology has been extended to measure and characterize the rheology or state change of hydrotransport, tailings and other slurries. SONAR algorithms together with multiple sonar-arrays located at different circumferential positions on a single sensor band, provide a direct measurement and characterization of the slurry velocity profile at the installation location, thus enabling advanced warning to operators as to when a sand bed is developing in a slurry pipeline. The velocity profile information can also be leveraged to provide value-driven solutions in a variety of areas as follows:

Stationary Sand Bed Detection

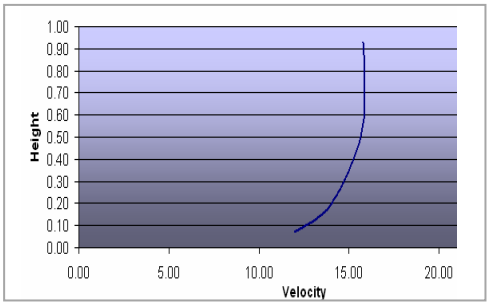
For years, mining and oil sands operators have been utilizing data acquired from existing instrumentation and equipment such as flow indication, pressure, pump amps and density to predict deposition velocity. There are also models employed that take into consideration such inputs as ore characteristics. In spite of all this, sand-outs still occur, costing an operator sometimes millions of dollars in lost production and clean-up costs. *Why do these traditional indicators not always predict or prevent all sanding events?* One explanation is that process conditions and ore properties are always changing. There is no practical method to measure changing ore characteristics and properties on a real-time basis. Measurements provided by traditional instrumentation and modeling require some interpretation by the operator and with some of these instruments, the data reported will actually lag the formation of a sand bed. As a result, a sand-out can occur before an operator can take preventative action costing millions of dollars in downtime, lost production and clean-up costs.

Intervention Mitigation

Based on the interpretation of data provided by several conventional instruments as described above, an experienced operator can sometimes intervene to avoid a pipe sand-out condition. Depending when the high degree of stratification or sanding event is noticed, the intervention can last hours. Typically, when an operator detects a potential sand-out condition, the procedure is to increase the flow velocity and increase the amount of water dilution added to the slurry mixture. Depending on ore grade, d50 and a variety of other factors, the interventions can last minutes or many hours. Even if a pipe sand-out is prevented, the operation usually sustains negative consequences, regardless of the intervention. In a hydrotransport slurry line, for example, intervention due to a potential sanding event, even if caught early, can lead to a period of lower production with negative impacts to recovery from the process upset. Less tonnes/barrels and lower recovery directly translate into lost revenue. In both hydrotransport and tailings slurry lines, increased water usage translates into higher energy requirements. By leveraging the velocity profile information provided by the *SANDtrac* velocity profile technology, the operator can mitigate the number of interventions, as well as minimize the severity of the negative impacts to the process by receiving advanced warning of a high degree of stratification and/or the formation of a stationary sand bed.

Line Flushing

Depending on a number of process variables, there are times when a stationary, or standing, sand bed remains in the pipe after a water flush. When the process is brought back up, together with a variety of other factors, this sand bed can exacerbate conditions which can lead to an intervention or a sand-out event. The information provided by a *SANDtrac* velocity profile system can indicate when a stationary sand bed remains, after a pipeline water flush. Conversely during a flush, the *SANDtrac* velocity profile system can also provide an indication that a stationary sand bed no longer is present, thereby minimizing unnecessary water and energy usage.



***SANDtrac* Velocity Profile**

- Sand Bed detection warning provided to DCS through 4-20mA output
- Option for Velocity Profile delivered to desktop via ethernet or modbus connection
- Multi-system plans available

Additional Potential Benefits (Intrinsic Benefits)

- Improve piping life cycle by operating at the minimum required flow velocity to maintain suspension and reducing the amount of unplanned pipeline maintenance.
- Optimize tailings deposition with respect to dyke & cell building by maintaining process stability with ideal solids concentration/flow velocities.
- Potential insight into hydrotransport conditioning effectiveness. Improving hydrotransport efficiency by optimizing process conditions can lead to increases in recovery.

SANDtrac™ Velocity Profile System Specifications

Parameter	Specifications	Comments
Pipe diameters	10” to 36”	Inquire with CiDRA for availability and specifications on sizes greater than 36”.
Flow velocity range	Liquid: 3 to 30 ft/s (0.91 to 9.1 m/s)	Minimum flow can be application dependent.
Sensor head	Clamp-mounted onto the existing pipe section; designed for single installation	
Transmitters with integrated flow processors	Programmable by keypad or PC interface Self-diagnostics capability	
Operating Temperature Range: Transmitters (in heated enclosures) Sensor head process temp. Sensor head ambient temp.	 -40°F to +140°F (-40°C to +60°C) -40°F to +212°F (-40°C to +100°C) -40°F to +140°F (-40°C to +60°C)	 Inquire with CiDRA for temperatures outside these specified ranges.
Storage Temperature Range: Transmitter Sensor head	 -22°F to +176°F (-30°C to +80°C) -40°F to +185°F (-40°C to +85°C)	
Cable between transmitter and sensor head	PLTC or armored cable with one end connectorized	Cable lengths up to 300ft (90m)
Analog output	Two (2) isolated 4-20 mA current outputs	Provides three different profile states
Digital outputs	Alarm	
Digital interfaces	10Base-T Ethernet USB/Memory Stick RS232 serial	
Transmitter local display	LCD with backlight	
Data logging capability	Yes	
Transmitter enclosures	NEMA 4X, IP55	
Power requirements	AC version: 100 to 240 VAC, 50/60 Hz, 550 watts DC version: 18 to 36 VDC, 550 watts	
Area classification	Standard: Ordinary Location	
Altitude	5000 meters	Certified for high altitude regions

SANDtrac™

Contact CiDRA
To speak with an applications engineer about CiDRA’s *SANDtrac* systems or other CiDRA industrial process measurement solutions, call +1.203.265.0035 or visit our web site at cidra.com.

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